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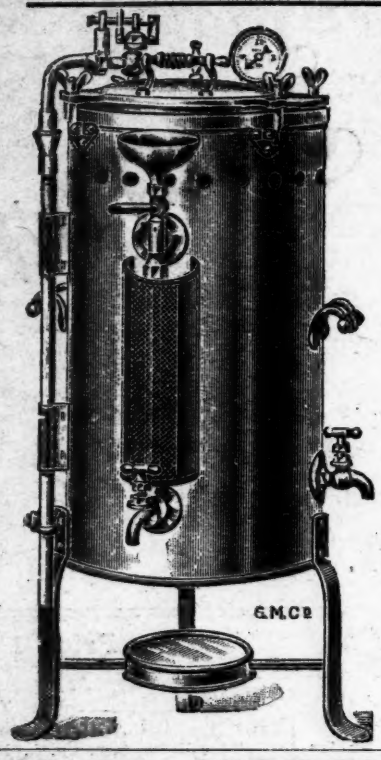

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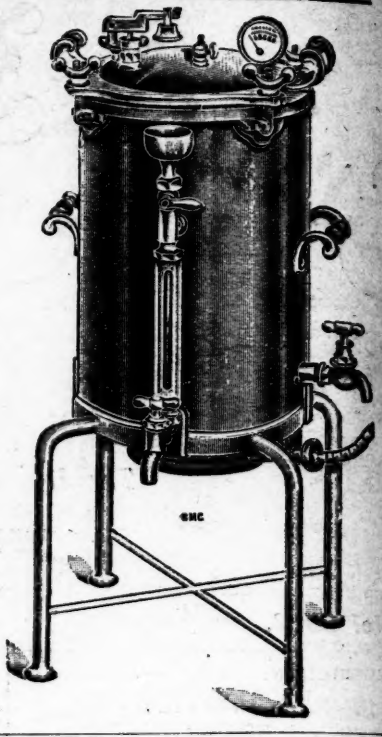

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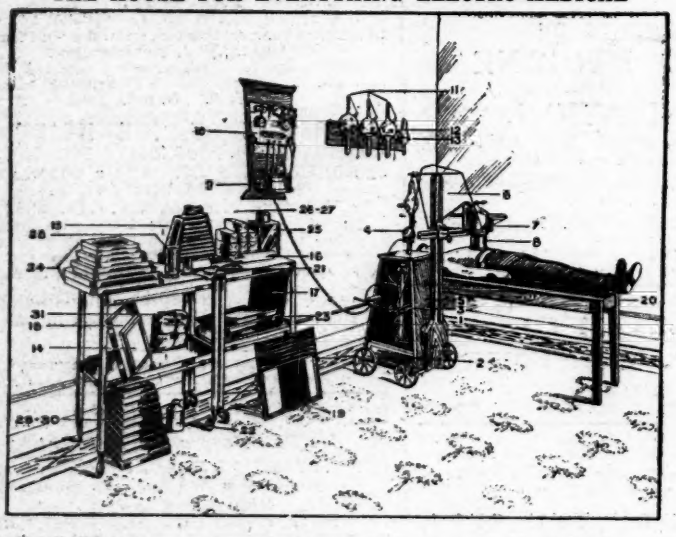

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THE CARE OF THE TUBERCULOUS SOLDIER.*

BY MAJOR P. HORTON-SMITH HARTLEY, C.V.O., M.D., F.R.C.P.,

HONORARY ADVISER ON TUBERCULOSIS TO THE MINISTRY OF PENSIONS; SENIOR PHYSICIAN TO THE BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.

In this paper I propose to bring before the conference the steps which are being taken in Great Britain to treat and assist the soldier who has acquired tuberculosis in the service of his country or whose disease has been aggravated thereby. Our allies may have adopted methods which differ in part at least from those in vogue in this country, and a consideration of such differences may be of material value in indicating the directions which our further efforts should take.

A year ago, in an article published in the journal, *Recalled to Life*,[1] I sketched out the proposals and plans which the Ministry of Pensions then had in view. In the present paper, based on my former article, I propose to bring the position up to date, to state what is being done and to indicate what there remains to do.

The problem is a vast one. Up to the end of last year about 20,000 men had been invalided from the British army suffering from pulmonary tuberculosis, and each year the war continues large numbers will be added to the total. The national importance of the problem is also heightened by the fact that too often a case entails suffering, not only upon the patient himself, but also upon those near and dear to him, thus augmenting suffering and greatly increasing the cost of treatment.

Need for Careful Examination of Recruits.

In considering the subject, we must first ask ourselves whether every care is exercised to limit the problem by seeing that men already suffering from tubercle are not admitted into the army. In the past this has not been the case. Men have been passed into the army who had previously been inmates of sanatoriums and had suffered from consumption. Of these, not all break down again, the result depending much on the hardships to which they may or may not be exposed, but many certainly do succumb after a longer or shorter interval and are invalided from the service, thus entailing great expense to the country in treatment allowances and pensions. It is clearly wiser, therefore, to exclude such men from the army, leaving them to continue their work, which may be of great value to the country, in their more sheltered civilian capacity. Great care must be exercised, therefore, in examining recruits. Histories of previous pleurisies and haemoptysis must be carefully inquired into and investigated, and the assistance of tuberculosis officers and others who have experience in the diagnosis of diseases of the chest invoked in any case where doubt or difficulty arises. The need of care in this respect is now more generally appreciated, but it must be constantly borne in mind, in the interest both of the country and of the individual recruit.

But if all such cases of obvious tuberculosis could be eliminated from the army we should still have a vast problem to deal with, for to the war itself must be attributed a large proportion of the cases of phthisis with which we have to deal. Modern research teaches us that nearly every adult is already infected with tubercle. Under normal circumstances the natural immunizing processes are sufficient to prevent the spread of the infection, and most of us carry the poison through life without harmful result. But under the strain of active service it is different. The soldier's strength becomes sapped by exposure and strain and his vitality diminished, and under these conditions the tuberculous focus, which might otherwise have remained for ever dormant, wakes into life, and signs of active disease, for the most part affecting the lungs, make their appearance.

Direct infection has no doubt also played its part in the spread of tuberculosis which we are considering. The close proximity of man to man, inseparable from life in tents and the unavoidable overcrowding sometimes met with in billets or huts, must have presented many opportunities for *massive* infection and consequent danger when a case of consumption has developed under such conditions.

Need for Early Diagnosis.

The next point which must be borne in mind is the necessity for early diagnosis, when once signs of pulmonary tuberculosis begin to manifest themselves, if we are to obtain the best results from treatment and prevent the further spread of the disease. In view of the insidious onset of the malady in so many cases this is by no means easy, especially under conditions of active service. The members of the Royal Army Medical Corps must, therefore, ever be on the watch for the disease, and when signs of lassitude, cough, and wasting make their appearance the man should at once be placed under observation, his temperature registered, and the sputum tested, not once, but many times. If this is done, in most cases the disease will be recognized early, and appropriate treatment will have the best chance of success.

Let us now consider what is being done in this country to secure for the soldier who has developed phthisis the treatment best suited for him in the different stages of his illness, and in the following pages pulmonary tuberculosis or phthisis will be especially considered, this being the chief problem with which we have to deal. It should be added, however, that treatment for surgical and other forms of tuberculosis is provided by the National Health Insurance Commissioners.

Treatment of Early Cases of Pulmonary Tuberculosis: Sanatorium Treatment.

As soon as it is evident that the patient is suffering from phthisis, or even when this is strongly suspected, he is sent home to one of the military hospitals in this country. If there is no doubt about the diagnosis he comes before a medical board, and in due course is invalided from the army, his further treatment being undertaken by the civil authorities. Before being discharged, however, from the military hospital, and in order to avoid delay in procuring him suitable treatment, steps are taken to arrange with the National Health Insurance Commissioners for his admission to a sanatorium, if he be an early case, or to a hospital if his disease be more advanced—every discharged soldier, whether insured or not, whose tuberculosis has, in the opinion of the invaliding board, been either "caused" or "aggravated" by military service, being now entitled, under arrangements recently made, to such form of treatment as his case requires. For this purpose a form (National Health Insurance, A.F.O. 1835), entitled "Application for Sanatorium Benefit on Discharge from the Army," is filled in, giving the man's name and intended place of residence on discharge, together with certain medical details in regard to his case. It is signed by the officer in charge of the military hospital, and forwarded to the National Health Insurance Commissioners of England, Scotland, Ireland or Wales (at the addresses given on the form), according to the part of the kingdom in which the applicant proposes to reside. Arrangements are then made by the Commissioners (under financial agreement between the Commissioners and the Treasury) whereby the soldier, now invalided from the service, is transferred, provided he be an early case and accepts the treatment, to a sanatorium, and this is, so far as possible, the institution with which the Insurance Committee of his place of residence has habitually made arrangements, and consequently, as a rule, not far from the patient's home.

Before leaving the hospital the case is also brought to the notice of the Local War Pensions Committee of the area in which the man will eventually reside. These bodies have now been established all over Great Britain, and one of their most important duties is to keep in touch with discharged soldiers and to assist them when in difficulty, and to obtain for them such treatment as they may from time to time require.

In the early period of the war not a few men refused sanatorium treatment in their anxiety to return home and see their relations and friends, from whom they had been long separated. This difficulty has been overcome by granting the soldier a fortnight's leave on full pay and allowances after leaving the military hospital and before entering the sanatorium. In other cases refusal of treatment may have been due, in part at least, to insufficient

* A paper read before the Inter-Allied Conference on the After-care of Disabled Men.

care on the part of hospital authorities in impressing upon the patient the necessity of accepting sanatorium treatment in the early stages of his disease. To give another chance to such patients, the Ministry of Pensions has made financial arrangements with the Insurance Commissioners whereby, if such a case is brought to their notice by the Local War Pensions Committee or otherwise within six months of discharge from the army, sanatorium treatment will be given with as little delay as possible.

Allowances during Sanatorium Treatment.

It was clearly useless, however, to expect men who may not feel very ill, and who are capable of some work, to accept sanatorium treatment should they feel that their families are in want as a result of their absence from home. It was decided, therefore, that whilst a man is at a sanatorium he shall be considered "totally disabled," and he is in consequence given an allowance at the maximum rate of pension, which, in the case of privates, amounts to 27s. 6d. a week (less a deduction of 7s. per week in respect of maintenance), together with a separation allowance of 13s. 9d. per week for wife, and of 6s. 8d. per week for the first child, 5s. for the second, and 4s. 2d. for the third and subsequent children, provided they are under 16 years of age. It may be added that, as provided by Article 4 of the Royal Warrant, if a man refuses to carry out treatment without good and sufficient reason, he is liable to forfeiture of anything up to one half of his pension.

Treatment at the Sanatorium.

During a patient's stay at a sanatorium he is kept in bed for a time, and as soon as it is clear that there is no pyrexia (or as soon as this has passed away), he is, at all well-run sanatoriums in Great Britain, treated by a system of graduated exercise—the German Liege-Halle system, of which rest is the chief factor, having never found much favour in this country, except, of course, in febrile cases. The exercise prescribed is at first walking only, but such a monotonous occupation is gradually replaced by light and useful work, increased little by little until at last, before their discharge, the most favourable cases do six hours' hard navvy work a day.

As a result of this treatment the patient, when the course is finished, returns home with his muscles in good condition and able to resume work, but he must continue to carry out at home, as far as possible, the open-air lines of treatment which he has learnt at the sanatorium, if he is to maintain his health. He must also be careful not to overtax his strength in the early months after his discharge, and only gradually return to full work, and even then he should be in a position to take a day off from time to time, and to rest if he should not be feeling quite himself. This has been the great difficulty with the sanatorium patient in the past, his "benefit" payment from his friendly society ceasing as soon as he returned to work of any kind, even for an hour or two a day, so that it has been incumbent on him to work at once "full time" if he is to earn his weekly wage and thus to support himself and his family. The ex-soldier is, however, in a happier position. The Minister of Pensions, recognizing the position, and appreciating the fact, accepted by all life assurance societies, that a man who has had consumption can never be regarded again as the equal of one who has not suffered from this malady, has taken steps in conjunction with the Ministry of National Service to see that all medical boards at which the soldier's pension will hereafter be reviewed, shall be furnished with the opinion and advice of the medical superintendent of the sanatorium (if the patient be still at the sanatorium when the board is held), and afterwards of the tuberculosis officer, who will have the future care of his case, and who will be conversant with his condition, so that the man's pension will be properly graded according to his working capacity, in so far as this is affected by his tuberculous disease. This is a matter of vast importance, and the Minister's wise and just decision will in future afford the patient a greatly increased chance of maintaining arrest of his disease.

Advice as to Work and Occupation after Leaving the Sanatorium.

It may at this point be of value to refer to the important question as to the kind of work which the patient should undertake on leaving the sanatorium, and the advice which should be given him in this respect, for upon a right decision in this matter his future health will largely depend. He will be a man who has probably had some former trade or occupation, and if this be not obviously injurious, the question often to be settled is as to whether he should return to his former occupation, which will probably offer him a good wage, even though this may necessitate his living in a city under "urban conditions." Some recent observations on the after-histories of patients who have left the Brompton Hospital Sanatorium, at Frimley in Surrey, are very instructive in this respect.[2] They would seem to show that the outlook of patients with limited disease who leave the sanatorium with their malady arrested, and who return to urban life under fairly satisfactory conditions, is infinitely less hopeful than the outlook of similar cases who have been able to effect a change of environment into the country, and sometimes a change of work. If possible, therefore, a return to town life should not be sanctioned, but in advising on the matter we must ever bear in mind the wage to be earned from any form of work proposed, for it is of paramount importance that the man should obtain from his work, supplemented by his pension, a sufficient income to enable him to be properly fed and adequately housed. Without this the most ideal climatic conditions will not save him from a breakdown and renewed activity of his disease. The work also must not be of too arduous a nature.

For this reason the advice so often given, urging the patient to give up his former occupation and to undertake, without any previous experience or training, the work of an agricultural labourer, is generally mistaken. The wages are not high, the housing accommodation is too often very poor, and the work is often exceedingly arduous. It is carried on under conditions of great exposure, and the hours at certain seasons are very long. As a result, only the exceptional case can stand it without breaking down, and it is not suitable for the average consumptive on leaving the sanatorium. We may add, too, that it is not a life which possesses great attractions for the former town-dweller.

In many cases, owing to the difficulty of finding a totally new occupation, and the fact that under such circumstances the man will at first be untrained, and therefore capable, for a time at least, of earning only a low wage, probably the wisest course is to allow the patient to return to his former avocation, provided it be not, like coal-mining, clearly and obviously unsuitable to a consumptive patient, *changing, however, the environment whenever possible.* To quote from my former paper:

> Thus, a clerk may return to his clerical work, but should obtain, if possible, a post in the country or at the seaside. Similarly, a bank clerk may often be transferred to a country or seaside branch. A railway porter should apply for removal to a country station, and a policeman to a suburban division, while a carpenter may obtain work as an "estate carpenter." In this way the patient is often enabled to return under good conditions to his former work, in which he is skilled, and can thus earn a better income than if he attempted a change of occupation. He has accordingly more money to spend in food, his vitality remains good, and his chances of keeping well are increased.
>
> Should it be necessary, however, to find a fresh occupation for a patient, then one must be chosen in which the work is carried on under satisfactory conditions, and as much in the open air as possible. Whenever possible, too, the employee should be to some extent his own master in regard to the number of hours worked each day, and the ability to take a day off from time to time, should he not be feeling quite up to the mark. In this way his strength is conserved, and the danger of a breakdown lessened.
>
> In deciding on the exact occupation the various trades should be considered. For example, in the building trade the work of a painter or decorator, a builder, a bricklayer, a carpenter or joiner may all be permitted, by preference, however, in a smaller rather than a larger town. Similarly, wood-carving or wood-road laying may be suitable. In the transport trades a man might take up the work of a coachman, cab-driver, chauffeur, taxi-cab driver, motor-van driver, or motor cleaner; but experience shows that the work of an omnibus or tram conductor or driver is too arduous in these days of large vehicles and rapid driving. Railway ticket collecting and some forms of mechanical work on the railways should also be suitable.
>
> Certain lighter forms of work on the land may also be recommended, such as market and flower gardening, fruit growing, hurdle-making, forestry, and woodman's work. The work of a gamekeeper, park ranger, park attendant, or lodge keeper is also excellent, but the number of such posts is limited. Other light occupations which may be mentioned are those of a

traveller, an insurance or commission agent, rent collector, canvasser (though in individual cases they may involve too many hours' walking), commissionaire, and bookstall attendant.

Should in any case the larynx be affected, an occupation involving much talking is to be avoided. Similarly, if the case be one liable to superadded attacks of bronchitis, then the less exposed occupations must be chosen. Window cleaning is not to be recommended, owing to possible risk of haemorrhage.

The above list of occupations is by no means exhaustive, and is given only as an indication of the kind of occupation which may be recommended. If the ex-soldier's occupation is thus changed, it is probable that, for a time at least, there may be some loss of income, but, as already pointed out, this will be taken into account when his pension is reviewed from time to time, in so far as the medical board is satisfied that the man's physical condition is affecting his normal working capacity.

The Value of Health Visitors.

A change of environment, and sometimes of work as well, such as we have recommended, is not, however, to be accomplished by the stroke of a pen, and certainly not without taking all the circumstances of the man's family and home surroundings into consideration. For this purpose the services of a health visitor who has had training in social work, as well as practical experience at a tuberculosis dispensary, have been found of great value. It is her duty, while the patient is at the sanatorium, to visit his home and to make herself acquainted with the circumstances of his family. Should the medical superintendent of the sanatorium, after becoming fully conversant with the man's case, advise a change of work and environment, it is her privilege, in co-operation with the Local War Pensions Committee and the Tuberculosis After-care Committee, where such exists, to help him to effect the change, and very often her efforts will be successful. Later it will be the duty of the health visitor to visit the home from time to time, to see that proper precautions are carried out and that the man reports himself to the tuberculosis officer for examination at regular intervals. She will also arrange for the examination of contacts, and give friendly counsel in regard to the occupation chosen for the children, bearing in mind their predisposition to the disease.

Health visitors such as these already exist in certain areas and are doing excellent work, and a proposal is now being considered by the Ministry of Pensions and the Local Government Board to establish them generally throughout the country, so that the tuberculous soldier may obtain the maximum benefit from the treatment which he is entitled to receive.

Treatment of Advanced Cases.

After the patient has returned to work he is kept under observation by the tuberculosis officer, the health visitor seeing that he reports from time to time for medical examination. Should he show signs of breaking down, it is the duty of the tuberculosis officer to obtain for him, through the Insurance Committee, the treatment which his case requires—possibly a further course of sanatorium treatment, possibly treatment at home under his panel doctor, or possibly a spell of hospital treatment.

A time will come, however, in most cases, when the disease becomes advanced, and the patient bed-ridden and totally incapacitated. He is now in urgent need of medical treatment and careful nursing, and it is a time when, in the interests of his wife and family, in order to avoid the risk of *massive* infection, which at this stage of the disease is a grave one, he should receive institutional treatment. Such cases in the past have too often drifted into the Poor Law infirmaries—when they have not declined such treatment and elected to remain at home, with all the attendant risks and consequences of their families—since provision for such cases is not generally made under the Insurance Act. To prevent this unsatisfactory state of affairs, provision of "advanced beds" has been made by the Minister of Pensions.

Arrangements in the first place have been entered into with the Metropolitan Asylums Board, whereby up to 150 beds have been made available in the hospitals under their charge in the various London districts for the treatment of such cases, which must be certified as "in need of residential treatment, though not likely to recover a reasonable degree of working capacity." At present three wards, containing 64 beds, have been opened, and as the necessity arises more will be placed at the disposal of the Ministry. The Metropolitan Asylums Board is responsible for the maintenance and treatment of the patients, the actual cost being paid by the Ministry. The arrangement has worked excellently, and the Ministry is indebted to the Metropolitan Asylums Board for the valuable help which it has given in this matter. The patients have been admitted without delay, have been well and sympathetically treated, and not a few have stayed until they died in the institution. As the patients for whom these beds are assigned are drawn from London and the adjoining counties, they are not too far removed from friends, who can visit them from time to time, and a sense of isolation is thus avoided.

In other parts of England beds for advanced cases are also being provided. At the Walker Gate Sanatorium, Newcastle, and at the Cottingham Sanatorium, near Hull, 15 beds at each institution have been placed at the disposal of the Ministry, and at Bierley Hall, Bradford, and at the Fazakerley Sanatorium, near Liverpool, 60 and 30 beds respectively will shortly be available. At the Cambridgeshire Tuberculosis Colony, at Papworth Hall, some ten miles from Cambridge, the Pensions Ministry has also obtained a lien on 40 beds, some of which will be used for advanced cases. In addition, small pavilions to accommodate 12 beds each (in the case of Birmingham 24) are being erected in the grounds of existing hospitals and sanatoriums—namely, at St. Helens, in Lancashire, at Birmingham, Derby, Southampton, Bristol, and Exeter, and these will shortly be in occupation. Towards the cost of the erection of these buildings the sum of £10,000 has been generously placed at the disposal of the Ministry by the British Red Cross Society and the Order of St. John of Jerusalem. The pavilions so erected, as well as the beds at the various institutions referred to above, will serve not only the urban districts mentioned, but also the surrounding areas, and the patients admitted will not be separated too far from relatives and friends.

It is interesting to note that in France our allies recognize equally with ourselves the importance of providing hospital treatment for the advanced tuberculous soldier, alike in the interest of the patient himself and with a view to preventing the spread of infection to his family, in this last and most dangerous stage of the disease, and that the erection of a hospital for this class of case is in contemplation by the French Red Cross Society.

Farm and Training Colonies.

In conclusion, I must say a few words in regard to farm and training colonies. In discussing the question of the work which a patient should take up after leaving the sanatorium, I have indicated that there are certain occupations, such as coal-mining, which, though not unhealthy in themselves, are clearly unsuitable for the consumptive. If the patient's previous occupation has been of such a nature, he must, therefore, perforce effect a change. A certain number of such patients may have had some previous knowledge of the land and be desirous of undertaking training in agricultural work, and for such as these farm colonies are being started. To these institutions the selected patients will be drafted direct from the sanatorium, and at them they will stay a year, since adequate training cannot be given in a shorter time. During this period treatment will be continued, and the patient will also be trained in agricultural work, market gardening, pig-keeping, bee-keeping, poultry-farming, and dairy work, together with rough carpentry and metal work, so that at the end of his stay he will be in a position to undertake work on the land either in this country or the colonies, or if he should eventually find other work, he would possess the requisite knowledge to cultivate an allotment with profit and success. During his year's stay the arrest of his lung disease should be rendered more secure.

Such colonies are a new development and are still in the experimental stage, for it is not known whether, under the existing conditions of the labour market, when well-paid work is so easy to obtain, men will be content to remain a year at a colony, nor can it be said as yet with certainty how far the after-history of a colonist, trained and treated as above, is better than that of a man who has simply passed through the full course of graduated labour at a first class sanatorium, and returned to suitable work in good environment at the end of his three or four months' treatment. This being so, and as the cost to the country of treating and training a patient at such a colony for a year will be considerable, the Ministry of Pensions is proceeding carefully in the matter, but if such colonies prove successful the scheme will no doubt be extended.

At present four such colonies are being started. They are as follows:

1. The Red Triangle Colony, at Kinson, five miles from Bournemouth, under the management of the Young Men's Christian Association. (21 colonists.)

2. The Cambridgeshire Tuberculosis Colony, at Papworth Hall, some ten miles from Cambridge, at which the Ministry

has a lien on 40 beds, some of which will be available for colony patients.

3. The colony now being inaugurated through the generosity of Mr. R. A. Pilkington in connexion with the Liverpool Sanatorium, in Delamere Forest. (30 colonists.)

4. The Royal Victoria Farm Colony, Polton, near Edinburgh, originally started by Sir Robert Philip. (Possibly 100 beds.)

Each of these colonies will probably develop on slightly different lines, as dictated by local conditions. At Kinson and at Edinburgh the colonies, as at present advised, will be purely agricultural. At Delamere Forest it is hoped that, through the good offices of H.M. Office of Woods and Forests, training in forestry will also be given, for which there will be full scope after the war, and it is possible too that training in a trade, such as clog-making, may be provided for certain of the colonists. At Papworth, under the energetic management of Dr. Varrier Jones, there will be training in agricultural and gardening work, but carpentering and engineering shops are also being erected. In the latter a course of instruction will be given, having as its basis the agricultural motor trade, such motors being now much in request in the agricultural counties adjoining Papworth, and the work of driving such ploughs having been found suitable for the patients. The colony at Papworth bids fair, therefore, to develop into a training colony rather than a farm colony pure and simple.

Such variation is all to the good, and will help to show on what lines the movement may best attain permanent success.

The patients sent to the colonies by the Ministry will be carefully selected, and will be those with early disease, in whose sputum tubercle bacilli have been found, or who have had a definite attack of haemoptysis or pleurisy with effusion, thus leaving no doubt as to the correctness of the diagnosis. The patients will be received direct from the sanatorium, and must be capable of working at least six hours a day without pyrexia, malaise or undue acceleration of pulse. They will engage to stay a year at the colony. During their stay payments for maintenance and training will be made by the Ministry on behalf of patients whose cases have been accepted by the Ministry at rates agreed upon between the body responsible for the management of the colony and the Ministry. The individual patient will also be entitled to the following benefits: During the year of treatment and training the man's pension will be in abeyance, but he will receive instead an allowance at the rate of 27s. 6d. per week, from which a certain amount will be deducted weekly towards the payment of his board and lodging. Out of the balance it is proposed to pay over to him 5s. weekly, leaving the remainder to accumulate for his benefit until he leaves the colony, or, should he desire it, the balance may be paid weekly to such dependants as he may name. In addition to the above allowance, the colonist will be entitled during the last six months of his course to a weekly bonus of 5s. per week, provided that he completes satisfactorily the full year's course of treatment and training. This bonus will be paid to him at the termination of his year's course.

At the Kinson Farm Colony it has been decided (and possibly similar arrangements may follow elsewhere) that at the end of the twelve months' course the colonist will also receive a small sum, representing half the net profits (as apportioned among the colonists) which it is hoped may accrue from the successful farming operations of the colonists, the exact amount depending largely upon their individual efforts. The remaining 50 per cent. will go towards defraying the cost of the maintenance of the colonists.

Such are the lines on which farm or training colonies are being developed in this country, and it is hoped that these institutions may be the means of giving a fresh start in life to many a deserving patient, who might otherwise drift downhill by returning to unsuitable work amid unsatisfactory surroundings. In association with the other measures already taken for the proper care and treatment of soldiers whose tuberculosis has been caused or aggravated by military service, they are also an earnest of the firm resolve of the Minister of Pensions to spare no pains and to save no effort in his determination to do all possible to help these most deserving men, who have jeopardized their health in the service of their country.

References.

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REMARKS ON ROENTGENOGRAPHIC PELVIMETRY.*

By W. R. MacKENZIE, L.R.C.S.Edin.,

Assistant Surgeon to the Samaritan Hospital for Women, Belfast.

In considering the use of the Roentgen rays in the diagnosis of pregnancy, and in the prognosis of difficult labour, attention is to be paid to the size and shape of the mother's pelvis and of the fetal head, and also the relation of the one to the other. This paper deals chiefly with the former, as in the majority of cases the abnormal presentation is due to pelvic deformity rather than fetal abnormality.

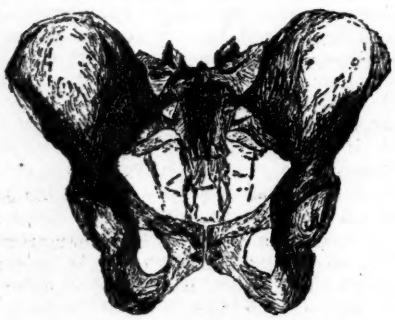

Fig. 1.—Drawing from skiagram of a normal pelvic bone, "standard pelvis."

Since the existence of contracted pelvis was first reported by Arantius various methods have been employed for diagnosing the existence and measuring the extent of pelvic deformity.

External pelvimetry, introduced by Baudelocque, while enabling us to measure directly the external pelvic diameters, and thence to draw certain conclusions as to the degree of contraction, is insufficient for estimating the size of the pelvic cavity. This cannot be done directly in the living woman.

Internal Pelvimetry.—A method was devised by Skutsch which makes it possible to estimate the size of the pelvic cavity indirectly and with fair accuracy, but as the employment of his instrument is usually painful to the patient, an anaesthetic is required if an accurate diagnosis is to be made.

The Roentgen rays, it was thought possible, might afford a valuable method of investigating the size and shape of the pelvis, but it was found that, while an excellent idea as to shape was obtained, that as to size was erroneous, owing to the fact that the sacrum and pubis lay at different levels from the sensitive plate, and consequently one portion of the pelvis was enlarged out of all proportion to the other. This defect made it impossible to utilize the radiograph for purposes of mensuration.

The employment of the following method will obviate this difficulty, and make it possible not only to see the existence and extent of the pelvic contraction both of the inlet and outlet, but also to compare it with the normal pelvis, and measure its degree without causing much inconvenience to the patient.

Method.

In a normal pelvic bone, which is designated the "standard pelvis," the various diameters, both external and internal, are accurately measured. When this bone is radiographed definite points can be marked on the plate; the distance between these points will bear a definite ratio to that between the corresponding points measured on the pelvis. This radiograph is taken as the "standard plate." By radiographing the patient in the same position as the "standard pelvis," having the points of focus the same, the *x*-ray tube at the same angle and the same distance from the sensitive plate, an accurate comparison of the patient's plate with the "standard plate" will be obtained, and therefore of the patient's pelvis with the "standard" or normal pelvis; from it the internal measurements can be mathematically worked out; when compared to the direct measurements they are fairly accurate, as is shown by Figs. 1 and 2, there being an error of 2 mm. only. To work out mathematically the transverse diameter, for example, of the pelvic inlet the length of the transverse diameter of the pelvic radiograph of the patient is multiplied by the transverse diameter of the standard pelvis, and divided by the transverse diameter of

Fig. 2.—Drawing from skiagram of abnormal pelvic bone.

*Read before the Ulster Medical Society, March, 1918.

the standard plate. In the same way the antero-posterior diameter of the inlet or the transverse diameter of the outlet can be worked out. I have not mentioned the oblique diameters, because if the true conjugate is diminished the oblique will also necessarily be reduced in proportion.

Fetus.

It is possible to obtain the *x*-ray shadow of the fetus *in utero*, and this is a great clinical advantage in cases in which there is doubt as to the presence of pregnancy or the existence of abnormality. I am unable to state the earliest month at which the fetus can be recognized. It is necessary to take the *x*-ray plate in the earlier stages, if pelvic measurements are required, for in the later stages, as will be readily understood, the outlines of the pelvis may be more or less obliterated by the presenting part. An accurate comparison between the fetal skull and the pelvic inlet can be obtained if the photograph be taken when the head is about to engage in the pelvis.

While it is possible to measure the diameter of the head which lies parallel to the transverse diameter of the pelvis, it is not so with the diameter which enters the true conjugate. Therefore dependence must be placed on comparison rather than measurement. Even on finding the relations of the fetal head to the mother's pelvis satisfactory, we must take into account the inability to judge the exact amount of mobility existing between the bones of the fetal skull, which, if soft, would mould themselves to the pelvis, but if densely ossified would be incapable of reduction in size.

Fig. 1 is a drawing from a skiagram of a normal pelvic bone, which is taken as the "standard plate"; the dimensions are:

	Pelvis: Direct Measurements.	Skiagram.
Inlet:		
Antero-posterior	11.5 cm.	13.5 cm.
Transverse	13.6 cm.	15.9 cm.
Outlet:		
Transverse	11.0 cm.	12.0 cm.

Fig. 2 shows an abnormal pelvic bone, the internal measurements of which show a very slight diminution when worked out by the above method as compared with the direct measurements, there being only an error of 3 mm. in the antero-posterior diameter of the inlet, 2.1 mm. in the transverse diameter of the inlet. It also shows clearly the diminution in the outlet.

	Pelvis.		Skiagram.
	Direct Measurement.	Worked Out.	
Inlet:			
Antero-posterior ...	10.5 cm.	10.2 cm.	12.0 cm.
Transverse	12.0 cm.	11.79 cm.	13.7 cm.
Outlet:			
Transverse	7.5 cm.	7.5 cm.	8.2 cm.

Fig. 3, drawn from a skiagram, represents the pelvis of a healthy woman, aged 25 years, who has had three normal labours, and whose external measurements are normal. The internal measurements have worked out very satisfactorily when compared with the standard plate.

	Standard.			Mrs. "A."		
	Pelvis.		Skiagram.	Pelvis.		Skiagram.
Inlet:						
Antero-posterior...	11.5 cm.		13.5 cm.	11.5 cm.		13.5 cm.
Transverse... ...	13.6 cm.		15.9 cm.	13.6 cm.		16.0 cm.
Outlet:	Direct.	Worked Out.		Direct.	Worked Out.	
Transverse... ...	11 cm.	—	12.0 cm.	—	11 cm.	12.2 cm.

Fig. 4 is a drawing from a skiagram of a woman with a flat pelvis. This patient's first child was eviscerated and her second was delivered by Caesarean section. The transverse diameter of the inlet is normal, but the antero-posterior is diminished over an inch. The transverse diameter of the outlet is 1 cm. larger than normal.

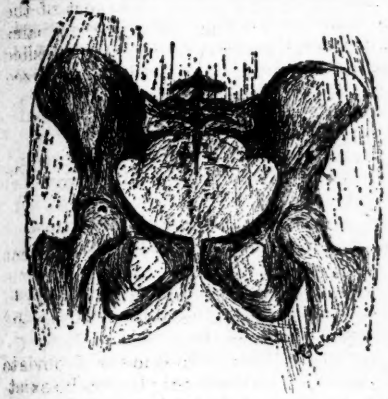

FIG. 3.—Drawing from skiagram—normal pelvis of healthy woman.

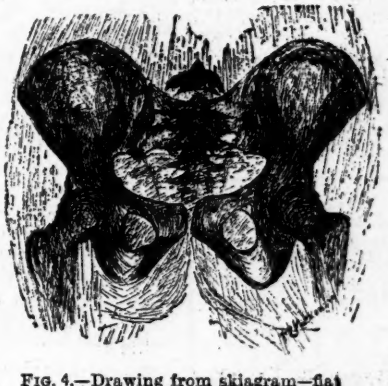

FIG. 4.—Drawing from skiagram—flat pelvis.

FIG. 5.—Drawing from skiagram—generally contracted pelvis.

	Standard.		Mrs. "B."	
	Pelvis.	Skiagram.	Pelvis.	Skiagram.
Inlet:				
Antero-posterior ...	11.5 cm.	13.5 cm.	8.5 cm.	10.0 cm.
Transverse	13.6 cm.	15.9 cm.	13.6 cm.	16.0 cm.
Outlet:				
Transverse	11.0 cm.	12.0 cm.	12.19 cm.	13.3 cm.

Fig. 5 is drawn from a skiagram of a woman with a generally contracted pelvis. This patient's first confinement was terminated by craniotomy and the second by Caesarean section.

	Standard.		Mrs. "C."	
	Pelvis.	Skiagram.	Pelvis.	Skiagram.
Inlet:				
Antero-posterior ...	11.5 cm.	13.5 cm.	9.6 cm.	11.3 cm.
Transverse	13.6 cm.	15.9 cm.	11.71 cm.	13.7 cm.
Outlet:				
Transverse	11.0 cm.	12.0 cm.	10.8 cm.	11.8 cm.

Fig. 6 represents the pelvis of a healthy primipara seven and a half months pregnant. She consulted her own doctor as to his prognosis of a normal labour. He found on external pelvimetry that the distance between the anterior superior spines was only 8 in. and that between the iliac crests 9½ in. She was sent to me for *x*-ray pelvimetry.

External.—On comparing her *x*-ray plate with the "standard" there is considerable narrowing and apparent

flattening of the iliac bones, more marked on the right side. When worked out, the amount compares favourably with the doctor's direct measurements.

Between Iliac Crests.	Pelvis.	Skiagram.
Standard	28 cm.	32.5 cm.
Mrs. I.	23 cm.	26.8 cm.

At the level of the antero-inferior spines the bones are distinctly narrower than normal.

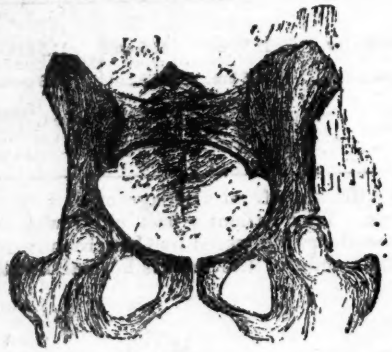

FIG. 6.—Drawing from skiagram—female pelvis showing deformity of iliac bones and normal cavity.

Internal.—On comparison with the "standard," the inlet appears normal, and when worked out it is as follows:

	Antero-posterior.		Transverse.	
	Pelvis.	Skiagram.	Pelvis.	Skiagram.
Standard	11.5 cm.	13.5 cm.	13.6 cm.	15.9 cm.
Mrs. I.	11.5 cm.	13.6 cm.	13.6 cm.	16.0 cm.

This case demonstrates clearly the advantages of this method of pelvimetry.

Fig. 7 is a case of normal full term pregnancy with a normal delivery, *x*-rayed at eight and a half months, and showing the fetal head engaging the pelvis.

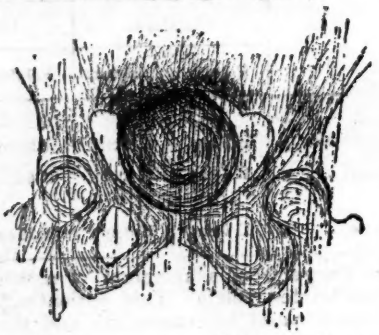

FIG. 7.—Drawing from skiagram—fetal head engaging pelvis.

Conclusion.

In conclusion I would like to emphasize the following:

1. The necessity of a "standard" plate for pelvic measurements.
2. The patient must be radiographed in the same position as the "standard" pelvis, having the same point of focus, the *x*-ray tube at the same angle and at the same distance from the sensitive plate.
3. The accuracy of diagnosis in showing to advantage the variety of pelvic contraction, and the ease with which the various pelvic diameters can be worked out.
4. The minimum amount of discomfort to the patient compared to other methods of pelvimetry.
5. The absence of any ill effect to the fetus.

FROM October next the University of Maryland will admit women students to the medical department. Women have been admitted to the dental and pharmacy departments for some time.

THE PART PLAYED BY CONCOMITANT INFECTION WITH ANAËROBIC ORGANISMS (OTHER THAN B. TETANI) IN THE CAUSATION OF TETANUS.

BY

WILLIAM J. TULLOCH, CAPTAIN R.A.M.C.,

MEMBER WAR OFFICE COMMITTEE FOR THE STUDY OF TETANUS.

(From the Laboratories of the Lister Institute.)

I. INTRODUCTION.

THE problem of tetanus is bacteriological, and susceptible of solution only by bacteriological inquiry. While it is a platitude thus to state that the important factor in the causation of tetanus is reproduction of *B. tetani* in the living tissues or in immediate proximity thereto, it is almost necessary at the present time to emphasize this factor of infection as opposed to the factor of intoxication. The tendency on the part of investigators to focus all attention upon the process of intoxication and upon its mechanism has led to the disease being regarded from too limited a view point—that of the pharmacologist and physiologist.

The result has been that the prophylaxis of the disease has been so far limited to the employment of tetanus antitoxin, and to those general surgical measures designed for the limitation of sepsis. Admittedly tetanus antitoxin has reduced to a very remarkable extent the incidence of tetanus, but one feels that, as the immunity conferred by the prophylactic use of this agent is transient, lasting apparently only seven to ten days, and as even its repeated employment at seven-day intervals for a period of four weeks has not absolutely eliminated the disease, other influences in its causation, notably those relating to infection, are worthy of special attention.

The general surgical methods directed to the limitation of wound infection have also done much to assist this reduction in the numbers of cases of tetanus. It must be clearly appreciated, however, that even the most efficient antiseptic is unable to sterilize an infected wound, for the conditions obtaining in a wound, notably the presence of living tissue, are such that the value of any reagent which can be incorporated in a dressing is much reduced in respect of its bactericidal and antiseptic properties. So far, no substance has been obtained which does not exert a deleterious influence upon the tissues at the same time as it exerts a restraining influence upon the growth of bacteria in the wound exudate.

The ideal method of dealing with war wounds, which are all infected to a greater or less degree, is excision of the wound area. This, however, is not always practicable, and even when practicable a certain number of cases are bound to remain considerably infected—though the mass infection is greatly reduced—owing to the conditions under which military surgery must be practised in the field.

In what Direction can the Prophylaxis of Tetanus be Improved?

The experiments to be described indicate one direction in which improvement can confidently be hoped for and the measures which they suggest, while they in all probability will result in the limitation of the incidence of gas gangrene, will also form a valuable adjuvant to the prophylactic measures at present in use for the prevention of tetanus.

The reason for conducting the experiments under consideration is indicated in the results obtained by Vaillard and Vincent, and by other investigators, who demonstrated that tetanus spores deprived of toxin by washing and heating, when injected into animals, do not frequently determine the development of the disease. If, however, an irritant foreign body were introduced, or a solution of an irritant chemical were injected along with such spores, tetanus almost invariably supervened. Similar experiments, in which growths of staphylococci or other aërobic micro-organisms were used as the irritant, gave variable results.

It may be stated broadly, then, that anything which causes devitalization of tissue will enhance the infectivity of *B. tetani*. The devitalizing factors that play a notable part in war wounds are (1) trauma and the presence of

foreign bodies in the tissues, (2) concomitant infection with other organisms.

The first of these is, when possible, dealt with by the surgical measure of excision of the wound area, which procedure also to a great extent limits infection with all organisms. But upon the nature of the concomitant infection may largely depend the subsequent development of tetanus. Anything which tends to bring about necrosis, and especially necrosis of muscle, will greatly enhance the development of the tetanus bacillus in wounds.

Is there any Known Infection Common in War Wounds that Leads Especially to Devitalization of Muscle?

While any infection by staphylococcus, streptococcus, or the colon bacillus, etc., may to some extent lead to this, there are two organisms which are particularly suspect—namely, *B. welchii* and *Vibrion septique*. As both of these develop diffusible toxins, and as the toxin of *B. welchii* is known—in consequence of the brilliant work of Major Carrol Bull, U.S.A.M.C.—to be definitely "myotropic," it seemed of special value to determine the influence of the toxins of *B. welchii* upon the development of tetanus. An investigation of this kind is all the more imperative in that an antitoxin to *B. welchii* is available, while the prevalence of this organism in wounds, and its capacity for rapid growth, make it a peculiarly dangerous constituent of wound flora. It seems not improbable, too, that this suggested symbiotic relationship between *B. welchii* and *B. tetani* may play some part in the causation of cases of delayed tetanus. It is conceivable that when wounds have healed and a slight trauma, received later, has resulted in the development of acute tetanus, there has been a reproduction of *B. welchii* or *Vibrion septique* locally which has exerted a trigger effect in the development of resting tetanus spores lying in the wound area. In such instances it is improbable, unless the trauma be fairly severe, that *B. tetani* develops without some assistance of the kind indicated. In an animal susceptible to tetanus the degree of infection by *B. welchii* required to light up tetanus need not be marked, so that it may well escape clinical observation.

Could we combat the necrotizing influence of *B. welchii*, and of other similar organisms, during the early stages of wound treatment much might be done to assist in the healing process, and, what is equally important, a healthier scar with fewer necrotic islets within it would be obtained. In order to investigate the symbiotic relationship suggested in the preceding paragraph the following experiments were undertaken.

II. Examination of the Influence of the Toxin of B. welchii upon the Development of Tetanus Spores in vivo.

Reagents Employed.

In all series of the experiments the tetanus spores were prepared thus:

Tubes of Douglas broth, enriched by the addition of fresh sterile rabbit kidney and incubated to ensure sterility, were inoculated each with one of the definitive serological strains of *B. tetani*. The tubes were incubated for three weeks at 37° C., by which time the maximum sporulation had taken place. The growths were then filtered through sterile wool, centrifuged, and the supernatant fluid pipetted off. The deposit was suspended in saline and the tubes again centrifuged. This process having been repeated twice, sufficient saline was added to make the spore content of each suspension equal to 2,000 million spores per cubic centimetre, and the suspension was then heated to 80° C. for thirty minutes.

The toxin of *B. welchii* employed was of such potency that it caused the death of one guinea-pig of 250 grams weight out of three that were inoculated, when administered intramuscularly in a dose of 1 c.cm.; and only produced slight oedema when injected by the same route in a dose of 0.2 c.cm. diluted in 1 c.cm. of saline.

The antitoxin of *B. welchii* used was the product of the Rockefeller Institute of Experimental Medicine, and was marked as "Horse 2," and contained 1,400 units of antitoxin per cubic centimetre.

A preliminary series of experiments was carried out (1) to determine approximately how many washed and heated tetanus spores could be injected into the guinea-pig without causing the development of tetanus, and (2) to determine what dosage of the toxin of *B. welchii* available invariably produced the disease (tetanus) when injected along with a constant number of tetanus spores, but was by itself unable to cause more than slight oedema, demonstrable by palpation.

These preliminary experiments showed that if care were taken 1,000 million washed and heated spores could be injected in a volume of 1 c.cm. into the gastrocnemius of the guinea-pig without causing tetanus. It was therefore decided to employ this number of spores in all subsequent experiments, as such a number excluded the possibility of any inoculum consisting entirely of non-viable spores.

When this number of spores was injected along with 0.2 c.cm. of the toxin of *B. welchii*, the whole inoculum having a volume of 1 c.cm., acute tetanus invariably developed on the second or third day after inoculation. This experiment was carried out using three series of three animals each.

1. Animals *a*, *b*, and *c* were injected with 1,000 million Type 1 tetanus spores *plus* 0.2 c.cm. of *B. welchii* toxin, the volume of the inoculum being 1 c.cm. and the inoculation made into the right gastrocnemius.
2. Animals *d*, *e*, and *f* received the same inoculation, but Type 2 spores were used instead of Type 1 spores.
3. Animals *g*, *h*, and *i* received the same material, but Type 3 spores were used in this instance.

All nine animals died of acute tetanus between the second and third days after inoculation. Control experiments, in which 1 c.cm. of normal horse serum was inoculated into the left gastrocnemius before the inoculation was made on the right side, showed that normal horse serum did not prevent the fatal issue.

When a smaller dose of the toxin of *B. welchii*—less than 0.2 c.cm.—was employed, especially if it were diluted, the results were variable. It was therefore decided to employ in future experiments 0.2 c.cm. of the toxin. Having thus obtained an experimental method which gave constant results, I proceeded to determine whether passive immunization with *B. welchii* antitoxin would prevent the development of tetanus in animals inoculated with mixtures of tetanus spores and *B. welchii* toxin. The following series of experiments was therefore carried out. Details are given of the experimental methods employed in each series.

Experiment I.

Guinea-pig I was inoculated in the right gastrocnemius with 1,000 million spores Type 1 (U.S.A.) tetanus in 1 c.cm. saline. For the first five days the animal was well; on the sixth and seventh days it limped slightly (? local tetanus); on the eighth day there was no obvious limp, and on the remaining six days during which the animal was under observation it remained well.

Guinea-pig II was inoculated with 1,000 million spores Type 1 tetanus *plus* 0.2 c.cm. *B. welchii* toxin (volume 1 c.cm.). The following day there were signs of local tetanus; on the second day there was definite local tetanus; and on the third day the animal died.

Guinea-pig III also received 1,000 million spores Type 1, *plus* 0.2 c.cm. *B. welchii* toxin (volume 1 c.cm.), in the right gastrocnemius. One hour later 1,400 units of *B. welchii* antitoxin were injected into the left gastrocnemius. The animal showed no sign of tetanus, and remained well during the period it was under observation.

Experiment II.

Guinea-pig I A was inoculated in the right gastrocnemius with 1,000 million Type 2 tetanus spores in 1 c.cm. saline. It remained well for the first five days; on the sixth there was a slight limp (? local tetanus); on the seventh day there was definite local tetanus; on the eighth general tetanus, and the animal was killed.

Guinea-pig II A was inoculated with 1,000 million Type 2 tetanus spores, *plus* 0.2 c.cm. *B. welchii* toxin (volume 1 c.cm.). On the first day the animal appeared to be well; on the second it was moribund, and was killed.

Guinea-pig III A received 1,000 million Type 2 tetanus spores, *plus* 0.2 c.cm. *B. welchii* toxin (volume 1 c.cm.), in the right gastrocnemius. Two hours later 1,400 units of *B. welchii* antitoxin were injected into the left gastrocnemius. For the first five days the animal was well; on the sixth and seventh days it limped slightly (? local tetanus); on the eighth day the limp was less marked, and on the ninth day the animal was well, and remained well during the time it was under observation.

Experiment III.

Guinea-pig I B was inoculated with 1,000 million Type 3 tetanus spores in 1 c.cm. saline, in the right gastrocnemius. Guinea-pig II B received 1,000 million spores Type 3, *plus* 0.2 c.cm. *B. welchii* toxin (volume 1 c.cm.). Guinea-pig III B was inoculated in the right gastrocnemius with 1,000 million spores Type 3 *plus* 0.2 c.cm. *B. welchii* toxin (volume 1 c.cm.), and received 1,400 units *B. welchii* antitoxin in the left gastrocnemius. Guinea-pig I B remained well; Guinea-pig II B died of tetanus on the third day; and Guinea-pig III B, beyond exhibiting slight stiffness of the inoculated limb from the sixth to the fourteenth day after inoculation, remained well.

The deductions to be drawn from these three experiments are self-evident. They indicate that an antitoxin for *B. welchii* and tetanus antitoxin should be employed together for the routine serum prophylaxis of tetanus. The evidence is unequivocal that the antitoxin of *B. welchii*, in addition to neutralizing its toxin, has the advantage that it completely protects (in the case of the guinea-pig) against the development of tetanus spores in tissue which has been exposed to the devitalizing effect of that toxin. It is highly probable that the same protecting value would be found in the case of man.

Attention is called to the death of the control animal, I A, in Experiment II. The death of this animal, while in no way detracting from the validity of the experiments or of the deductions to be drawn from them, indicates that the development of tetanus depends upon a number of different factors. It is not improbable that in this instance a certain degree of trauma, when the inoculation was made, was responsible for the development of the infection. It is to be specially noted, however, that while the test animal, II A, died on the second day after inoculation, the control animal did not die until the eighth day. Moreover the test animal died of acute, almost fulminating, tetanus, while the course of the disease in the control animal was much less acute. Experiment II is therefore exceptionally instructive, for, while it shows that the danger of infection with *B. tetani* and notably of early development of the disease owing to symbiosis with *B. welchii* could be considerably mitigated, if not completely eliminated, by the use of a combined serum for prophylaxis, it also calls attention to the fact that while such a reagent would probably be of great value, surgical measures could not be permitted to be less carefully applied because of its introduction.

I call attention to this as, if a combined prophylactic serum were to be introduced, it might lead to the development of a feeling of false security, and too optimistic a view might be taken regarding the probable value of such a combined serum. As a natural sequence its unmerited condemnation would ensue if the results obtained did not completely bear out expectations.

III. Influence of the Toxin of Vibrion septique on the Development of Tetanus Spores in vivo.

Vibrion septique is another of the organisms which are commonly found in wounds, and develop diffusible toxic products. While it is not known whether the toxin of this organism is a particularly active necrotizing substance or only has marked oedema-producing properties, it seemed of importance nevertheless to determine the possible influence which it might exert upon the development of tetanus.

As the properties of this toxin, then, are at present less well defined than are those of the toxin of *B. welchii*, the experiments to be described in this section cannot be so clearly interpreted as are those dealt with in section II of the present communication. This difficulty is enhanced by the fact that at the time of writing specific *Vibrion septique* antitoxic serum was not available, so that protection experiments could not be undertaken.

I here wish to record my thanks to Miss Robertson of the Lister Institute of Preventive Medicine for placing at my disposal a quantity of the toxin of *Vibrion septique*.

The methods employed and the results obtained in making this investigation were as follows:

Experiment IV.

Guinea-pig A was inoculated in the right gastrocnemius with 0.25 c.cm. *Vibrion septique* toxin *plus* 0.75 c.cm. saline. On the first day there was slight oedema and stiffness of leg. On the second day the oedema was palpable, but not extensive; there was still stiffness of leg. On the third day the oedema was almost gone and the leg less stiff. On the fourth day the animal had almost recovered, and on the fifth day it was well, and remained so during the period of the experiment.

Guinea-pig B was inoculated with 0.25 c.cm. *Vibrion septique* toxin, *plus* 0.25 c.cm. saline, *plus* 1,000 million tetanus spores, Type 1. On the first day there was slight oedema and stiffness of leg. On the second day oedema palpable but not extensive; still stiffness of leg. On the third day the animal was recovering, and on the fourth it had almost recovered. On the fifth day it was well, and remained so.

Although the oedema resulting from the injection of 0.25 c.cm. of this toxin was quite as marked as, if not more marked than, that produced by 0.2 c.cm. of the toxin of *B. welchii*, it is remarkable that tetanus did not develop. I therefore decided to make the test much more stringent, employing 1 c.cm. of the toxin *plus* 1,000 million tetanus spores. The result of an experiment employing this technique is shown below.

Experiment V.

Animal C was inoculated in the right gastrocnemius with 1 c.cm. *Vibrion septique* toxin *plus* 0.5 c.cm. saline. On the first day there was marked oedema over the whole of the injected limb; on the second the oedema was more marked and extending over the abdominal wall, soft on palpation. The next day the oedema was reduced and the animal lively; limb stiff. On the fourth day the oedema was disappearing; leg still stiff. On the fifth day the animal had recovered, and remained well till the conclusion of the experiment.

Animal D received 1 c.cm. *Vibrion septique* toxin, *plus* 1,000 million Type 1 tetanus spores. On the first day there was marked oedema over the whole of the injected limb; on the second, oedema as in animal C. On the third day the oedema was reduced and the animal lively, but limb stiff. Fourth day, oedema almost gone; leg still stiff. On the fifth day the animal was well, and remained so.

A slight stiffness of the limb remained in both animals until the completion of the experiment, which was considered to have occurred on the fourteenth day. The animals have remained well, and the stiffness is slowly disappearing. This experiment is striking in that although the oedema produced in the animals was much more marked than that resulting from the injection of 0.2 c.cm. of the toxin of *B. welchii* employed in the previous series of experiments, no development of tetanus occurred.

This result was scarcely expected, and the experiment was therefore repeated.

Experiment VI.

Animal E was inoculated with 1,000 million Type 1 tetanus spores suspended in 1.5 c.cm. of saline. Animal F with 1 c.cm. of *Vibrion septique* toxin *plus* 1,000 million Type 1 tetanus spores. These animals both remained well, so corroborating the findings indicated in Experiment V.

As the disturbance produced by *Vibrion septique* toxin—oedema production—was so pronounced, it seemed remarkable that tetanus did not develop. The experiment was repeated a second time, using spores of a representative Type 3 tetanus bacillus. The findings of this experiment are as follows:

Experiment VII.

Animal G was inoculated in the right gastrocnemius with 1,000 million Type 3 tetanus spores suspended in 1.5 c.cm. saline. It remained well. Animal H was inoculated with 1,000 million Type 3 tetanus spores *plus* 1 c.cm. *Vibrion septique* (volume 1.5 c.cm.). There was marked oedema on the first day, but the animal was active. On the second day there was general tetanus, and the animal was killed.

As specific antitoxin for *Vibrion septique* was not available it was decided not to complete the present series of experiments using Type 2 spores, for the results shown in Experiment VII indicate that *Vibrion septique* may, like *B. welchii*, play an ancillary part in the causation of tetanus.

The negative results obtained on three occasions when Type 1 spores were used indicate, however, that the toxin of *Vibrion septique* is probably a less constant factor in stimulating the growth of *B. tetani* in the tissues than that of *B. welchii*. In view, however, of its frequent occurrence and in view of the fact that it sporulates more readily than does *B. welchii*, its capacity for doing harm is possibly extended over a more prolonged period than is the case with *B. welchii*. It would seem, therefore, advisable that antibodies to the toxin of *Vibrion septique* should also be included in serum used for the prophylaxis of tetanus.

Commenting on the results obtained in the two series of experiments described in the present communication, it is to be noted that Vaillard and Vincent foreshadowed the possibility of its being demonstrated that certain organisms might play a more important part in stimulating the growth of *B. tetani in vivo* than would others.[1]

Conclusions.

1. There is good ground for believing that the ancillary part played by *B. welchii* in the causation of tetanus is clearly defined. The capacity of this organism for doing harm in the connexion under consideration can be almost eliminated by the use of the antitoxin for *B. welchii*.

2. The capacity shown by the toxin of *Vibrion septique* for stimulating the growth of tetanus spores *in vivo* is more

variable than is that of *B. welchii*. Experiment VII indicates, however, that it too may play a part in the causation of tetanus.

3. It follows from conclusions 1 and 2 that antibodies to the toxins of *B. tetani*, *B. welchii*, and *Vibrion septique* should be included in all serum employed for the prophylaxis of tetanus.

4. While such a polyvalent serum promises to reduce still further the incidence of tetanus it would be too optimistic to assume that it would absolutely eliminate that disease, for infections other than those dealt with in this communication may also play a part in stimulating the growth of *B. tetani* in wounds. One of these, *B. œdematiens*, I propose to investigate immediately.

REFERENCE.
1 *Annales de l'Institut Pasteur*, January 1st, 1891.

ANEURYSM OF THE THIRD PART OF THE LEFT SUBCLAVIAN ARTERY,

SUCCESSFULLY TREATED BY LIGATURE OF THE SECOND PART.

BY HERBERT H. BROWN, M.D., F.R.C.S.,
SURGEON TO THE EAST SUFFOLK HOSPITAL, IPSWICH.

IDIOPATHIC aneurysm of the subclavian artery is not common, and until recent years its treatment has been most unsatisfactory. Ligature of the first part of the artery is an operation of considerable difficulty, owing to the anatomical relations of the vessel and its depth from the surface, and in pre-antiseptic times was invariably fatal.

The second part, behind the scalenus anticus, has apparently not often been chosen for ligature; but it is far more accessible than the first part, and the operation is not especially difficult. In the case recorded below, I started the operation with the idea of ligaturing the first part, but found the second part could be more easily reached, and there was no difficulty in ligaturing the vessel. The result of the operation was completely satisfactory.

The patient, a farm labourer aged 50, was admitted into the East Suffolk Hospital on February 27th, 1918, complaining of severe pain in the left arm, which kept him awake at night. There was a pulsating oval tumour extending above the clavicle into the posterior triangle, rather smaller than a hen's egg. The left radial pulse was distinctly smaller than the right. The systolic pressure in the right brachial artery was 230 mm., in the left 195. The patient was kept in bed, given potassium iodide, and morphine at night.

Operation.

On March 8th, 1918, an incision was made along the posterior border of the sterno-mastoid, commencing at about its centre, and extending over the head of the clavicle for an equal distance on to the thorax; it was about six inches in length or rather less. The posterior edge of the sterno-mastoid was defined, the muscle drawn inwards, glands, etc., removed, and the internal jugular vein exposed. The attachments of the sterno-mastoid to the upper border of the clavicle, and of the pectoralis major to the lower border, were divided, and the inner half of the bone cleared with a periosteal elevator, the clavicle was divided with a saw, disarticulated at the sterno-clavicular attachment, and the inner half removed. The subclavius muscle was taken away and a large suprascapular vein; the subclavian vein was then exposed and cleaned. After removal of some lymphatic glands the scalenus anticus with the phrenic nerve was defined. It was evident that the aneurysm commenced at the outer edge of the scalenus anticus, and was confined to the third part of the artery. The first part had not yet come into view. The phrenic nerve was drawn inwards, the vagus, internal jugular, and internal carotid were also retracted out of the way, and the scalenus anticus muscle divided a short distance above its attachment to the rib.

The second part of the subclavian artery was now fully exposed to view. It appeared to be quite healthy and normal, and there was no difficulty in passing a ligature round it. Two silk ligatures of No. 4 silk were tied sufficiently tightly to occlude the vessel without rupturing the coats. Pulsation in the aneurysm and radial artery immediately ceased. The wound was closed after suturing the divided sterno-mastoid and pectoral muscles, and a small drainage tube left in the centre of the wound. This was removed after forty-eight hours.

The patient made an uninterrupted recovery. The left arm and hand continued to be quite warm and free from pain. There was never any cyanosis or oedema. Muscular movements and sensation were unaffected. He left the hospital on March 28th, within three weeks of the date of operation.

I saw the patient again a month later—April 28th. He looked and felt perfectly well. All movements of head and arm were normal. He was quite free from pain and was advised to return to work. The radial pulse was still absent; the only trace of the aneurysm was a very small soft tumour above the clavicle resembling a lipoma. The systolic pressure in the right brachial artery was then 165 mm.

The operation has apparently been completely successful.

I am indebted to Colonel A. Carless for his kindness in giving suggestions as to the line of incision and *modus operandi*, and to my colleague, Mr. A. Y. Pringle, and Mr. Arthur Woo, the house-surgeon, for assistance during the operation.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A CASE OF CEREBRAL TOXAEMIA—? "BOTULISM."

THE following notes relate to a patient recently under my care. In the light of the interest lately aroused in the subject of botulism, and in consideration of the "epidemic" character of that disease, a report of this case, which occurred in Glasgow, may be suggestive epidemiologically. So far as I am aware, no case has, at this time, been recorded further north than Leeds.

Clinical Features.

J. G., male, aged 35, was admitted on May 6th, notified as typhus. His illness began on May 1st. The history, given by the relatives, was unsatisfactory, but headache, sickness, constipation, stupor, and delirium were the prominent features. The latter two appeared early, persisted throughout, and, as the disease progressed, tended to deepen.

On admission: coma, pyrexia (101–108° F.), sudamina or toxic erythema, dry brown flaccid tongue, bucco-pharyngeal hyposecretion, dysphagia, palatal paralysis, divergent strabismus, slightly dilated pupils reacting sluggishly to light, and retention of urine. Cerebral excitement was a prominent feature, producing muscular tremors greatly aggravated by interference. Forcible raising of the arms or separation of the legs revealed a spastic tone of the musculature. Movements constant, irregular, quick, choreoid (as in choreic diplegia), involuntary—although sufficiently purposive to necessitate restraint of the arms to prevent interference with catheterization. Sensation appeared hyperacute, as even slight digital pressure induced exaggerated collateral muscular response. Knee-jerks exaggerated, Kernig and Babinski present, ankle clonus indefinite. Heart: rate 120–144, sounds indefinite. Lungs: broncho-pneumonic catarrh. Trace of albumin in urine. Abdominal examination negative.

Although, clinically, the case in no way resembled typhoid fever, the Widal reaction showed complete agglutination of *B. typhosus* in a dilution of 1 in 50 in an hour and a half.

Whereas, on admission, there appeared to be photophobia, next day paresis of both levatores palpebrae superioris was evident, and on the day before death there was bilateral ptosis with slightly contracted, fixed pupils. Bilateral facial paralysis was suspected, but could not be established on account of the profound stupor. Percussion over the chin and attempts at drinking produced a curious clonus of the masticatory muscles. The electrical reactions were not examined. Sixty hours after admission death occurred peacefully as from a gradual paralysis of the respiratory centre.

Post-mortem Findings.

Skin.—Over the shoulders, upper arms, and sides of thorax there were numerous small, circular, brownish spots, of variable size, some showing minute vesicular elevation. Over both suprascapular regions and backwards over the shoulders there was a copious eruption of sudamina.

Chest.—The left lung was intensely hyperaemic and oedematous. The right lung had an ill-defined area of pneumonic consolidation in the lower lobe posteriorly, the upper part of the lobe and the upper lobes being hyperaemic and oedematous.

Heart.—The wall of the left ventricle showed cloudy swelling, and the cavity was dilated; valvular structures normal.

Abdomen.—Spleen enlarged, very hyperaemic, but fairly firm; kidneys hyperaemic; liver not enlarged, but on section some biliary staining and cloudy swelling. All over the cardiac end of the stomach the mucous membrane was hyperaemic, but

there was no ulceration. The pancreas appeared normal. The mucous membrane of the small intestine was deeply bile-stained throughout. Just below the caput caecum the mucous membrane was hyperaemic and haemorrhagic for 12 inches.

Brain.—The pia arachnoid over the parieto-occipital regions showed a large accumulation in the deeper sulci of a slightly opaque greyish fluid. The larger vessels of the meninges and throughout the brain substance were enlarged, and the tissue, both grey and white, was pinkish from hyperaemia. The spinal cord showed similar hyperaemia of its surface and substance.

A routine bacteriological, serological, histological, and physiological investigation is being undertaken, but the results are at present incomplete.

Although careful inquiry was made of the relatives, no evidence was forthcoming that the condition had a "food origin." Noteworthy features of the case were the sudden onset, the early appearance of stupor and extreme prostration, the multiplicity of signs pointing to central nervous system toxaemia, and the comparatively negative findings at section.

I am indebted to Dr. Archibald, medical superintendent, for permission to publish this case, and my best thanks are due to Dr. Buchanan, city bacteriologist, for the use of his notes made at the *post-mortem* examination.

JAMES LAW BROWNLIE, M.B.,
Ch.B.Glasg., D.P H.Camb.,
Senior Assistant Physician, Belvidere Hospital, Glasgow.

Reports of Societies.

INDUSTRIAL TUBERCULOSIS.

AT a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on May 24th, the President, Dr. G. S. BUCHANAN, in the chair, Dr. E. L. COLLIS (Director, Welfare and Health Section, Ministry of Munitions) opened a discussion on the incidence of industrial tuberculosis. Dr. Collis remarked that the etiological factors more or less intimately associated with industrial environment were: (1) Overcrowding, the aggregation in sufficiently close proximity to allow of spray infection by coughing amongst persons not inherently subject to an excessive incidence of tuberculosis; (2) the presence in an otherwise normal environment of an unusual number of cases of tuberculosis; (3) alcoholism, associated with industrial employment as "industrial drinking," whether by custom of the trade, or owing to conditions of heat or dust; (4) illness—that is, a lowered general resistance dependent upon long hours, imperfect ventilation, bad feeding, lack of rest and healthy recreation; (5) inhalation of injurious dust, which might be summarized as exposure to the inhalation of silica dust. Shoemakers illustrated the class where, save for the possibility of infection, no adverse influences, such as fatigue, low wages and malnutrition, alcoholism, bad housing, bad ventilation, or imperfect lighting, were more intense than in industries not suffering unduly from tuberculosis. A similar remark was applicable to the printing trades. The case of publicans and inn servants might typify the peculiar influence of alcohol as lowering the general bodily resistance, mortality being excessive for all causes. Tin miners showed the features of a group where a specific predisposing cause in the shape of exposure to silica dust was the important factor. The importance of contrasting these groups lay in the consideration that when it was desired to unmask the causes of an undue prevalence of tuberculosis it was necessary to know whether such prevalence were or were not associated with an unduly high mortality from other diseases. Were such an association found, then attention might be directed to some other influence which affected the issue; in the absence of such association, as in the case of shoemakers, the field of inquiry was narrowed. It was of interest to remark that the curve of age-incidence upon shoemakers was similar in form to that describing the experience of all occupied and retired males; the similarity being sufficiently striking to suggest that the influence at work, although more intense, was not different in kind from that responsible for tuberculosis incidence as a whole. On the other hand, the curves for publicans and tin miners were quite different both from the standard and from one another, suggesting a different etiology, which, on other grounds, was usually admitted to be the case. Owing to the great difficulty, amounting in many cases to impossibility, of securing industrial incidence rates, it was advisable to utilize the method of proportional mortality, that is, to study the proportion of recorded deaths attributable to tuberculosis. It appeared to be a rule admitting but few exceptions that when the proportional mortality was high the absolute incidence was also excessive, and he (Dr. Collis) was disposed to agree with Hoffman's conclusion that this method, although admittedly imperfect, could render valuable service in the investigation of industrial diseases. An important caution should be given in connexion with the study of mortality records—namely, that, owing to change of occupation, mortality returns were not altogether trustworthy indices of industrial morbidity. In this connexion the classical investigation of Finlaison in 1853 and the more recent work of Watson merited special notice. No complete study of industrial morbidity had been undertaken in this country, and such a task would appear to await the advent of a Ministry of Health.

Captain M. GREENWOOD (Welfare and Health Section, Ministry of Munitions) desired to direct attention to two points. In the first place, the death-rate from tuberculosis among women had shown a slight but real increase since the outbreak of war, amounting to about 6 per cent. between 1914 and 1916. Dr. Stevenson had suggested that this increase might be attributable to the employment of women in industry, and had drawn attention to the fact that women over 45 did not participate in the change. He (Captain Greenwood) found that an application of the tuberculosis rates observed among employed women at Leipzig, and published by the German Imperial Statistical Department in 1910, to the English female population as distributed in industries before the war and again in 1916 (according to the Board of Trade's estimates) gave approximations very close to the observed facts; hence it seemed very probable that the industrial redistribution produced by the war was really the explanation of the change. In the second place, he suggested that the explanation of differential incidence of tuberculosis by an appeal to selection—namely, the argument that it was not so much the occupation as the type of recruit entering the occupation which determined the incidence—was insufficient to account for the phenomena. If a prediction of the phthisis rate at ages 35-45 in industrial occupations (excluding the silica groups and, of course, non-industrial and professional classes) were founded upon the death-rate from all other causes at the same age, and also upon the death-rate at ages 25-35 in the same occupations as observed in the previous decennium, it appeared that certain groups—namely, bookbinders, printers, shoemakers, tailors, and cabinet-makers—exhibited an exceptionally heavy phthisis mortality, not to be accounted for either by their death-rate from other causes or their mortality at earlier ages (so far as this could be measured by the previous decennial records). Although the method was open to some criticism, its application appeared to support the opinion that in the occupations named a special and peculiar tuberculosis problem needed solution.

Dr. BENJAMIN MOORE, F.R.S. (Medical Research Committee), questioned whether Dr. Collis had put sufficient emphasis upon the factor of low nutrition. The majority of occupations experiencing a very heavy incidence of tuberculosis were characterized by the stigmata of intermittent and badly paid labour. Apart from these, he thought it was possible to classify occupations, bringing into relation the nature of the product handled and the incidence of tuberculosis. He also desired to emphasize the necessity of close study of the actual factory conditions.

Dr. JOHN BROWNLEE (Medical Research Committee) did not consider that the problem of tin miners' phthisis was entirely explicable on the lines followed by Dr. Collis. Attention must also be directed to the general epidemiology of the disease. Tin mining was a localized industry, and the curve of incidence upon *all* inhabitants of the district was *sui generis*. He had studied the age incidence of phthisis as portrayed in the regional reports of the Registrar-General, and the result emerged that, epidemiologically, phthisis was not one disease, but certainly two and perhaps three diseases, each characterized by a special age incidence. The student of industrial phthisis would have to take into consideration these epidemiological aspects of the subject.

PHYSIOLOGY OF CHLOROFORM ANAESTHESIA.

A MEETING of the Section of Anaesthetics of the Royal Society of Medicine was held on May 7th, with Dr. J. BLOMFIELD, Vice-President, in the chair. After sympathetic reference had been made to the recent lamented death of the President, Mr. George Rowell, Dr. G. A. BUCKMASTER read a paper entitled "Some considerations on the physiology of anaesthesia by chloroform." Experiments were described that had been carried out with Dr. J. A. Gardner for ascertaining anaesthetic and lethal quantities of chloroform in the blood of animals narcotized and killed, the part played by the red corpuscles in the transport of the drug, and the rates of assumption and elimination of chloroform. It was found that as much as 94 per cent. of the drug may be carried by the red corpuscles, in the cell proteins of which it is probably absorbed. In experimental anaesthetization with known percentages of chloroform a primary and secondary danger point were recognized. When the first is passed the average chloroform content of arterial blood is about 27 mg. per 1,000 grams of blood at disappearance of reflexes in the case of cats and 31 mg. in the case of dogs. During anaesthesia the quantity slowly and steadily increases. Respiration ceases in cats with about 40 mg. and in dogs with 61 to 69 mg. The body weight, without fat, appears to be without influence on the percentage of chloroform in the blood necessary to produce anaesthesia. It is the percentage value of chloroform in the blood that is important, for this remained constant during complete anaesthesia in animals with (1) normal quantity of blood, (2) diminution through haemorrhage, (3) augmentation through transfusion, though the total quantity of chloroform rose and fell with the corpuscular richness and poverty of the blood. This percentage value must stand in relation to the solution pressure in virtue of which the drug enters the cells of the organism. A chart was shown illustrating the rate of assumption of chloroform by the blood during anaesthesia and the rate of elimination afterwards. Chloroform is neither decomposed nor oxidized within the body. It was shown that in the work of Nicloux the carbon monoxide actually found was produced during the analysis of the blood gases. The blood yields carbon monoxide during blood-gas analysis over potash. Ventilation of the lung during chloroform narcosis can be ascertained only by plethysmographic methods with an apparatus similar to that used by Haldane and Boycott. During the first three minutes the lung ventilation is diminished by 50 to 60 per cent. of its original value. From this some recovery occurs, but prolonged anaesthesia always diminishes the lung ventilation by a similar amount, 60 per cent. of the original value. Tables were shown giving comparisons of the total blood gases under chloroform and ether. The former drug markedly affects the gas content of the blood, the latter scarcely at all. The diminution in oxygen content of the blood in chloroform narcosis is not due to the diminished lung ventilation, but probably to the direct action of the drug on the red corpuscles. During complete anaesthesia the fall in oxygen is 40 per cent. The haemoglobin is therefore only partially saturated with oxygen during chloroform narcosis. The haemoglobin is, in fact, in the same state of partial saturation with oxygen that it would be with an oxygen tension to the alveolar air of only 45.5 mm. Hg, whereas the normal tension is 99.49. A discussion followed, in which Dr. A. G. LEVY, Professor A. D. WALLER, Mr. P. L. MUMMERY and others took part. Dr. O. MILLAURO demonstrated an improved foot key with rubber surface for use with gas cylinders, and Captains C. HIRSCH and H. E. G. BOYLE showed apparatus for continuous administration of gas and oxygen and ether.

OVARIAN GRAFTING.

AT a meeting of the North of England Obstetrical and Gynaecological Society, held at the Medical Institution, Liverpool, on May 10th, with Professor BRIGGS, Vice-President, in the chair, Mr. BLAIR BELL read a paper on the technique and value of ovarian grafting in the human subject. He insisted that grafts must be autoplastic, small in size, and from the interior—follicles, as he pointed out, being unessential for the conservation of the uterine function. The operation was not indicated in women over 42, in women sexually inactive, or in cases where conservation was at all possible. Grafts were stored in the utero-vesical pouch until the later stages of the operation, and were then embedded either in the abdominal wound, the drainage wound, or in the fundus of the uterus, according to the variety of case operated on. After-histories in a series of 20 cases were noted as regards (1) absence of menopausal symptoms, (2) persistence of menstruation, and (3) general health. The paper was discussed by Drs. DONALD, WALLS, BRIGGS, GEMMELL, and SUMNER. Dr. WALLS exhibited a specimen of fibroid of uterus undergoing cystic degeneration; Dr. BRIGGS a large ovarian fibroma, 11½ lb. in weight, with no degeneration; and Mr. BLAIR BELL a specimen showing red degeneration in a fibromyoma uteri sixteen years after the last pregnancy, associated with pyosalpinx; and a large myoma uteri of unusual appearance and with few symptoms in a young woman aged 25. Dr. CLIFFORD read notes on a case of ascites in successive pregnancies with albuminuria. Dr. BRIGGS described a case of acute abdomen during pregnancy, due to twisting of the pedicle of a small ovarian fibroma with small fibroma of the abdominal wall; and Dr. HENDRY a case of missed abortion carried two months over the full term.

Reviews.

ADAPTATION AND DISEASE.

ALL pathologists will welcome, as should also all biologists, the appearance of Professor ADAMI'S Croonian Lectures on adaptation and disease in a volume in which are reprinted a number of earlier articles dealing with questions bearing on the theory of evolution.[1] Even if we may not always be in agreement with the learned author, he gives us much to think about and opportunity to clarify our minds. In the small space available here it is clearly impossible to do more than refer to the two main theses of the book, and, if difficulties are pointed out, they will, it is to be hoped, have the effect of sending readers to the book itself. A mere list of its contents would serve no good purpose.

One of these theses is that it is not true to say that no acquired conditions can be inherited. Few, if any, physiologists would be inclined to dispute this. Whether or not the germ plasm is susceptible to nervous action on the part of the organism that harbours it, it is impossible to believe that it is free from the influence of chemical factors contained in the liquid that surrounds it. Stockard's experiments on the degenerative changes produced by alcohol in guinea-pigs, effects still present several generations after exposure of the original animals to the vapour of alcohol, are given in detail in the book before us, and are conclusive. On the other hand, from this point of view it is not to be expected that mutilations of tissues which leave untouched other similar masses would have any effect on the germ plasm. I do not know whether Guthrie's work on the transplantation of ovaries in black and white fowls has been confirmed; but it also indicates an influence of the soma of the black variety on the germ plasm of the white variety, when transplanted into the former.

The other thesis—namely, that there is such a thing as direct adaptation—is likely to lead to more opposition. The question is one of great importance and the evidence must be carefully considered. I am bound to confess that the array of evidence brought by the author has failed to convince me. It may be due to failure to appreciate the complete meaning of the facts or to the influence of preconceived ideas; but I find it impossible to imagine how the incidence of a new force on an organism is more likely to result in a reaction which is favourable to that organism than the reverse. Whatever the reaction may be, it must be the result of the nature and properties of the reacting mechanism, and it may or may not be an appropriate one. If the former, it might perhaps be claimed as a direct adaptation; but surely the use of the word "adaptation" is misleading. Considerations of this kind have been put forward by Professor Parker of Harvard in the *American Naturalist*, vol. xlvii.

When we examine the evidence for direct adaptation, we find that it is of two kinds—either the development of new

[1] *Medical Contributions to the Theory of Evolution.* By J. G. Adami, M.D., F.R.S., F.R.C.P. London: Duckworth and Co. 1918. (Pp. 372; 7 plates, 20 figures. 18s.)

powers in successive generations of bacteria when exposed to new conditions, or the phenomena of immunity in the higher animals. In the former case, it seems difficult to exclude satisfactorily the intervention of favourable variations. We know that, in the absence of their favourite food, micro-organisms can utilize as sources of energy even such substances as paraffin, methane or hydrogen. Incidentally, it may be noted that this fact proves that food used for energy purposes does not become a chemical constituent of the protoplasm itself, any more than the petrol becomes a part of the motor. Now, are we certain that in cultures grown in a medium, which is normally so little acted upon that we say there is no action, there may not be a few individuals capable of such action in a small degree? If so, these would survive and the process might proceed according to the ordinary law of survival of the fittest. It may be possible to surmount this difficulty, but more convincing proof of adaptation would be given by results obtained on the same individual, by experiments on the lines of Abderhalden's "protective enzymes." Unfortunately, this observer has not yet shown the production of a *new* enzyme in response to the introduction of a foreign substance into the body. If an enzyme which is definitely known not to be present anywhere in the body were found to be produced, the results would be more to the point. On the contrary, more and more discredit is being cast upon Abderhalden's results even with foreign proteins, as in the much-advertised "pregnancy test."

The appearance of new diseases is a cognate problem, and it is discussed by Professor Adami in a very interesting manner. But here again some doubt may arise as to whether these diseases might not have been extremely rare and failed to come to the notice of any observers who were capable of appreciating their nature. It is true that examination of mummies and so on has not revealed their existence.

The evidence from the phenomena of immunity appears at first sight to be of a powerful kind. But it seems to me that much further knowledge is needed before we are justified in drawing such far-reaching conclusions as that of direct adaptation. Professor Adami is very scornful of Weismann's "ids" and "determinants," but, after all, are Ehrlich's "amboceptors" and "complements" in much better case? Great as were the services of Ehrlich in the early days, I often wish that some competent investigator with no knowledge of the "side-chain theory," or any other theory, would take up the study of immunity reactions. In this connexion we may note that a view of the constitution of living matter akin to the side-chain theory and the "biogen" theory of Verworn is advocated in the book before us. May I venture to suggest to the author that there is not much difference between the standpoint of structural organic chemistry and that of the pure morphologist? Professor Adami rightly insists on the necessity of the dynamic consideration of life, and theories of the kind referred to are becoming less and less acceptable as our knowledge of the mechanics of the cell increases. Do "biophors" possess "receptors" for paraffin and methane?

With regard to the persistence of changes once set up, it is to me a matter of wonder that a morbid process ever gets right again, rather than the reverse.

This review may seem to be more critical than appreciative. My desire is to induce all of those interested in the difficult problems discussed by Professor Adami to read the evidence for themselves. They will find it put in an interesting and instructive manner. The biological significance of the problems raised must be my apology should it be thought that too great a preponderance has been given to difficulties.

W. M. BAYLISS.

THE SPLEEN AND ANAEMIA.

THE value of combined work in medical problems, though generally recognized, is perhaps more commonly carried into effect in America than in this country. The results of this method are well shown in the recent volume on *The Spleen and Anaemia*,[2] by R. M. PEARCE, professor of research medicine, E. B. KRUMBHAAR, the assistant professor of research medicine, and C. H. FRAZIER, professor of clinical surgery in the University of Pennsylvania. Not only do these writers contribute separate sections on the experimental, clinical, and operative aspects of the subject, but the account of the experimental work is a summary of investigations, directed by Professor Pearce, into the relation of the spleen to haemolysis, blood regeneration, and haemolytic jaundice, and carried out since 1912 by various collaborators, including J. H. Musser, jun., in the Research Department dedicated to his father. The results thus obtained have been published in some twenty papers, mainly in the *Journal of Experimental Medicine*.

The book before us deals with the influence of the spleen, as shown by its removal, on the red blood corpuscles, and not with the pathology and all the diseases of the organ. It is dominated by the results of experimental research, which are set forth in detail with full reference to the results of other investigators, and occupy more than half the volume. After experimental splenectomy the red blood corpuscles show increased resistance to haemolysis, and haemolytic jaundice and haemoglobinuria are less readily induced than in normal animals. As the hypothesis of a free haemolysin in the spleen is the basis for splenectomy in haemolytic anaemias, the available data are carefully considered, and experiments undertaken with splenic extracts failed to show the presence of a haemolysin in the spleen. Splenectomy is followed by a secondary anaemia, and it is suggested that the increased resistance of the red cells is not due to the absence of the spleen but is in some way, at least in part, associated with the anaemia. There is a post-operative leucocytosis of the polymorphonuclear type, the lymphocytes later showing a slight increase. Metabolism after splenectomy, both experimental and curative, is given detailed consideration.

In the clinical section Dr. Krumbhaar, after remarking that the term "splenic anaemia" should be either discarded or its use restricted, as it is loosely employed for a group of diseases, suggests the following classification with an eponymous nomenclature: Gaucher's disease or large-celled splenomegaly; Banti's disease, in which is included the form ordinarily called chronic splenic anaemia of adults, and in its final stage complicated by hypatic cirrhosis; von Jaksch's anaemia infantum pseudo-leukaemica, which is dismissed as in all probability not a condition but an atypical response of the infantile haemopoietic system to primary diseases of the blood; and the two forms of haemolytic jaundice, the acquired (Hayem-Widal) form and the congenital or familial (Chauffard-Minkowski). The first two are due to imperfect formation of blood, the last two, of course, to haemolysis. In the chapter on the indications for splenectomy it is pointed out that this operation should not be done for polycythaemia in which there is hyperplasia of the red bone marrow and the spleen acts as the chief agent in keeping the plethora within the limits compatible with life.

The question of splenectomy in pernicious anaemia is ably discussed; the reports of some of the early successes have not been confirmed by subsequent information, some of the cases may have really been examples of haemolytic jaundice, and under the heading of pernicious anaemia there may be included different types, some of which are and some of which are not benefited by splenectomy. But on the whole, though a cure cannot be promised, splenectomy is in many instances not only justifiable but advisable. The account of the operative procedure of splenectomy is well illustrated by figures. In conclusion, this volume is a valuable summary of recently acquired knowledge.

[2] *The Spleen and Anaemia: Experimental and Clinical Studies.* By Richard Mills Pearce, M.D., Sc.D., with the assistance of Edward Bell Krumbhaar, M.D., Ph.D., and Charles Harrison Frazier, M.D., Sc.D. Philadelphia and London: J. B. Lippincott Company. The date of publication is not given, but the preface is dated September, 1917. (Pp. 419; 16 illustrations, colour and black and white. 21s. net.)

AT a meeting of the Hamburg Medical Society last year the chief subject for discussion was the oedema frequently observed as a result of war conditions. It was regarded by one speaker as due to inanition, and provoked by absorption of excess of fluid in the war diet and by a reduction of the fat in the blood leading to damage to the capillaries of the skin. He compared the consequent oedema with that seen in chronic malaria and tuberculosis. Another speaker said that war oedema was most common in adult males between the ages of 50 and 70. Children were practically immune, but during the last year of the war he had found growth and development retarded between the ages of 12 and 14.

BRITISH EQUIVALENTS FOR GERMAN MEDICAL SUPPLIES.

II.

It is not pretended that the products named in the previous article form a complete list of British achievements in chemical manufacture during the war. They have been given as indicating the spirit in which the manufacturers have approached an intricate problem. This spirit is not confined to the home country, for we learn that the Diarsenol Company of Toronto, Canada, has succeeded in making compounds to which they give the names diarsenol and neo-diarsenol, which are identical with the German salvarsan and neo-salvarsan. We are informed that the company has fixed an even higher standard than was advanced by German manufacturers, and that it has received a licence from the British Board of Trade on the same lines as the other manufacturers mentioned in the first instalment of this article. The Local Government Board has recently approved neo-diarsenol for the purposes of the Public Health (Venereal Diseases) Regulations, 1916. The price of the drug has been fixed, and it can be obtained from Mr. G. R. Brown, 15, Edmund Place, Aldersgate Street, E.C.1.

A number of other chemical firms, working on the same lines as those already described, have quite a long list of new medicinal chemicals to their credit. May and Baker, Limited, who, as already stated, are the agents in this country for arsenobenzol-billon and nov-arsenobenzol-billon, which are salvarsan and neo-salvarsan equivalents, also produce at their Battersea works adalin, a hypnotic designed to take the place of veronal, and also paraldehyde and xeroform.

A number of products, thirty or more, including salicylic acid, aspirin, calcium acetyl salicylate (soluble aspirin), digitalin, glycerophosphates, phenacetin, salol, as well as atropine, homatropine, hyoscine, and hyoscyamine, and their respective salts, have been manufactured by Boots Pure Drug Company, Limited, at Nottingham, since the war began, and are all preparations which were obtained either wholly or in part from Germany before the war. Boots are manufacturing, in addition, other synthetic drugs, such as chloramine-T, dichloramine-T, and halazone, the new antiseptic substances described by Dr. Dakin in our columns.

Not only with regard to drugs but also to medicinal waters, for which we relied to a great extent upon Germany and Austria-Hungary, the deficiency resulting from the stoppage of Continental supplies has been made up. A successful effort to substitute a British product for the German and Hungarian aperients has been made. Experimental borings at Harrogate have discovered a valuable spring, which Professor Percy Frankland, F.R.S., of Birmingham, has testified to be of a very high degree of organic purity. The water, bottled and standardized, has been placed on the market, under the name of Aquaperia, by Camwal, Ltd., of London. The same firm is manufacturing siphon tops and fittings of pure block tin, previously largely imported from Germany. An important article in which this country has become self-sufficient is the filter, thanks to the British Pasteur-Chamberland Company, the Fulham Pottery and Cheavin Filter Company, and other firms.

Turning to a totally different range of medical supplies, we find that the British manufacturer was able in a little time to adjust himself to an exceptional demand. Before the war the *x*-ray apparatus used in this country was to a considerable extent constructed in Germany. Some of the most popular *x* ray tubes were German, and so far as apparatus for single-flash exposures was concerned, Germany had an almost exclusive market. She also had the field largely to herself in the construction of instruments for estimating exposure and dosage. During the two years previous to the war the total value of exports from Germany of electrical apparatus for medical and dental purposes was more than £400,000, and the United Kingdom was the third largest importer. In this country only two or three firms were actual manufacturers of *x*-ray apparatus; the remainder were importers of the apparatus from abroad, not only from Germany, but from France and America, and even the apparatus which was put together in this country was largely dependent on Germany for the material.

Since the war there has been considerable activity and progress, all the more gratifying because among the few British manufacturers of this class of apparatus it has taken a definitely co-operative instead of a competitive form. A special section of *x*-ray manufacturers has been formed within the association representing the interests of the electrical trade as a whole, and the manufacturers in their effort to furnish a British equivalent for the German supplies have had not only the help of some noted physicists, but also the guidance and active support of a Government department. The Ministry of Munitions has interested itself in the whole question of *x*-ray tube construction, and the optical and glassware section of that Ministry has collaborated with a subcommittee of the manufacturers. A laboratory has been set up by the Ministry and equipped by the manufacturers with the object of carrying out research work for the improvement of manufacturing methods. The research has been largely occupied with a view to making in this country a suitable glass for the construction of tubes, and now everything connected with the *x*-ray tube can be produced here, including a satisfactory quality of tungsten. Originally the glass was of poor quality, gave blue instead of green fluorescence, and was very vitreous, but all the glass now made is remarkably good. The construction of the tube was the most difficult problem of all in the field of *x*-ray and electro-medical manufacture, but it has been surmounted, and, to mention only one firm, Cuthbert Andrews has placed on the market heavy-anode tubes made of British glass with all the characteristics of the best German glass. In the same way the manufacturers are turning out induction coils and transformers which are just as powerful and efficient as the instruments previously obtained from Germany, and apparatus for the single-flash exposure is now being constructed here from an improved design, as well as all the various accessories which go to form an *x*-ray unit.

One quite new industry so far as this country is concerned has sprung up under the stress of war conditions. This is the making on a large scale of fluorescent and intensifying screens. Before the war fluorescent and intensifying screens in platinocyanide of barium were chiefly of German production. One British firm, Watson and Sons, equipped a laboratory, placed it under the control of a well-known photographic chemist, Mr. Thorne Baker, F.C.S., and eventually established a works where grainless and rapid screens are now being successfully made, and more than replace the previous German screens in respect of quality and speed. Harry Cox and Company, Limited, also have placed on the market fluorescent and intensifying screens of very fine surface.

The same thing holds good of delicate instruments of precision, including some appliances for localization, and also measuring instruments. One of the instruments widely used for measuring the penetration of *x* rays was known as the Bauer qualimeter, a unipolar electrostatic voltmeter connected to the cathode terminal of the tube. An application was made by Newton and Wright, Limited, to the Controller of Patents, to have the German patent revoked in their favour, and a licence was duly granted to manufacture. The instrument has now been made here for some time past, and a royalty paid to the Board of Trade for the working of an enemy patent.

Apart from instruments and appliances definitely associated with *x*-ray work, a good deal of electro-medical apparatus was, previous to the war, imported from Germany, and is now made in this country. Seeing that the more general apparatus of this kind (as distinct from some special items like those already mentioned) is made by a group of manufacturers who have pooled their knowledge and work together for the advancement of this young industry, little purpose would be served by specifying individual firms, but it may be said that the range of articles now manufactured here—and before the war largely imported from Germany—includes milliampèremeters for measuring currents passing into a patient's body; apparatus working both from batteries and mains for the production of faradization, galvanization, and electrolysis; various surgical appliances, such as cautery instruments, and the apparatus for producing the correct current for these instruments. The same is true of orthopaedic appliances for mechanotherapy, apparatus needed for baths and massage, and, not least, instruments for the production of ultra-violet light. The delicate mechanism necessary for

this last, involving the use of mercury vapour lamps, has been most successfully constructed over here.

Surveying the whole of this field, it may be said that practically everything in the nature of electro-medical apparatus is now made in this country. Furthermore, standardization is much easier when all apparatus is manufactured here and the manufacturers are in close association, than when part is manufactured here and part is imported.

Among surgical appliances generally, one instance of definite substitution may be noted. This is the "Record" hypodermic and antitoxin syringe, for the making of which S. Maw, Son and Sons have put down a special plant. These syringes are now being turned out in large quantities, and, it is claimed, are of a better quality than the former German-made article.

In the first part of this article it was stated that atropine, homatropine, and eserine, were probably exclusively of German manufacture before the war. Messrs. Burroughs, Wellcome and Co. inform us that they had made certain alkaloids on a commercial scale at an earlier date. Thus they commenced the manufacture and sale of pilocarpine and its salts in 1900, of atropine and its salts and of eserine and its salts in 1901, and of homatropine and its salts in 1905. In 1911 they were able to execute from stock of their own manufacture a single order for 176 oz. of eserine sulphate. At the outbreak of the war they had a stock of over 600 oz. of atropine and its salts of their own manufacture. The same firm manufactured the original quantities of emetine bismuthous iodide required by the Medical Research Committee for the investigation into the value of the drug in dysentery. The firm has since manufactured and issued this salt in large quantities.

THE MILITARY SERVICE (MEDICAL PRACTITIONERS) REGULATIONS, 1918.

THE Local Government Board and the Secretary for Scotland have issued identical regulations[1] with regard to applications concerning medical practitioners for exemption from military service. The regulations, which came into force on May 23rd, provide for the appointment of a special medical tribunal for England and Wales, and another for Scotland, to deal with all applications for the grant, renewal, or review of certificates of exemption to medical men of military age. It is the intention of the Director-General of National Service to approve the existing Central Medical War Committee and Scottish Medical Service Emergency Committee as the medical tribunals. As in the past, applications concerning members of hospital and medical school staffs in the metropolis will be referred to the Committee of Reference appointed by the Royal College of Physicians of London and the Royal College of Surgeons of England, whose recommendations will be binding upon the medical tribunal.

Power is given to the tribunals, with the approval of the Director-General, to appoint or recognize local professional committees to assist in the investigation of areas and of individual cases.

In dealing with applications, the tribunal may hear witnesses, and receive written statements, and the applicant has a right to be heard in person or through a representative, and to put relevant questions to witnesses.

Application for the grant or renewal of a certificate of exemption may be made on any of the following grounds:

(*a*) That it is expedient in the national interests that the practitioner should, instead of being employed in military service, be engaged in other work in which he is habitually engaged; or in which he wishes to be engaged; or, if he is being educated or trained for any work, that he should continue to be so educated or trained.

(*b*) That serious hardship would ensue if the practitioner were called up for army service, owing to his exceptional financial or business obligations or domestic position.

(*c*) Ill health or infirmity.

(*d*) Conscientious objection to combatant service.

Applications must specify all the grounds, whether occupational or personal, on which exemption is claimed, with a full statement of the reasons on which the claim is based; they must be made in duplicate on the prescribed form, and must be sent to the appropriate medical tribunal. Where some other person applies on his behalf the practitioner must join in the application and sign the form. Applications must be made within fourteen days of the date on which individual notification is sent to the practitioner by the Director-General of National Service. Before applying for renewal or variation of a certificate, leave to apply must first be granted by the medical tribunal; in ordinary cases such request must be duly made and delivered within four days of the expiration of the certificate. The Director-General may require the medical tribunal to review the case of any practitioner holding a certificate. With the assent of the Director-General the tribunal may grant, renew, or vary a certificate without hearing the case, if satisfied that the grounds of application have been established. They will hear all other cases, four clear days' notice being sent both to the applicant and to the practitioner, where these are not one and the same person.

Regulation 24 lays down that "a certificate of exemption may be absolute, conditional, or temporary, as the medical tribunal think best suited to the case, . . . provided that—

> A certificate granted or renewed on occupational grounds shall, and a certificate granted or renewed on personal grounds may, be subject to the condition that the practitioner shall undertake such professional service and under such conditions as the Director-General of National Service may, after consultation with the medical tribunal and in concert with any Government Department concerned, from time to time deem best in the national interests."

The importance of this proviso scarcely needs emphasis. In every case the decision of the tribunal will be communicated at once in writing to the applicant, to the practitioner, and to the Director-General. Where it is decided to grant a certificate this will be issued to the practitioner concerned; but if leave to appeal against their decision is given by the medical tribunal a certificate will not be issued or withdrawn pending the final decision of the case. Every certificate of exemption will state the ground or grounds on which it is granted, the date on which it will expire, if temporary, and the conditions, if any, on which it is granted; and in giving a certificate the tribunal may direct that the holder shall not be liable to join the volunteer force. The clerk to the tribunal may issue, on payment of a fee of 1s., a duplicate of a lost, destroyed, or defaced certificate. Power is given to re-hear cases with the consent of the Director-General. Lastly, the regulations apply to voluntarily attested and enrolled medical men equally with other practitioners.

MEDICAL EXAMINATION.

The Director-General of National Service on May 22nd issued directions requiring qualified medical practitioners of military age—that is, those born after April 18th, 1860—to report themselves for medical examination on receipt of individual notice duly served on them. It is expressly stated, however, that a practitioner will not in any event be called up for military service until he has been sent by the Ministry of National Service a further notice specifying the time for the making of an application for a certificate of exemption, and until any application which may be made in accordance with the notice has been disposed of by the medical tribunal. Such application must be made within fourteen days of the date of sending such further notice, and no practitioner need take any steps to apply for exemption until such further notice is sent to him. The above directions were announced in the advertising columns of the JOURNAL last week, p. 26.

[1] To be purchased through any bookseller, or directly from H.M. Stationery Office, at Imperial House, Kingsway, London, W.C.2; 23, Abingdon Street, London, S.W.1; 37, Peter Street, Manchester; 1, St. Andrew's Crescent, Cardiff; and 23, Forth Street, Edinburgh. Price 1d.

THE new building of the medical college of Cincinnati University was formally opened on February 25th. It was erected and equipped at a total cost of approximately £120,000.

THE Surgeon-General of the United States Navy has framed a scheme for increasing the accommodation in naval hospitals. Some 15,000 extra beds have been provided, and it is proposed to augment this number by 8,000 beds, together with 3,270 beds for the hospital personnel. The naval medical officers are in charge of two hospitals in France, each with 500 beds, and arrangements are being made to establish three naval hospitals in England, each with 1,500 beds.

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MEDICAL PRACTITIONERS AND MILITARY SERVICE.

THE regulations governing the position of medical men under the new Military Service Act have now been issued, with effect from May 23rd, and their main provisions are briefly described this week at page 622. We believe that in the course of the next few days the Ministry of National Service will issue a memorandum to members of the medical profession explaining at some length the purpose of these regulations, and the procedure which is to be based on them. It is already almost a truism to say that the new Act—which raises the age of military service for medical men to 56—will affect, either directly or by a side wind, the work and life of every practitioner in the country, and it is important that all should study carefully the facts of the situation. We can only hope that the documents prepared for their guidance by Government departments will clarify rather than confuse the issue.

In the first place it is to be noted that the Central Medical War Committee and the Scottish Medical Service Emergency Committee, which have hitherto been so in all but name, are now made special medical tribunals for dealing with applications for exemption from military service on behalf of medical men; that the Committee of Reference keeps its name and its functions under the new regulations; and that power is given to retain the valuable assistance rendered by the local medical war committees. The grounds of exemption, though more precisely defined, and now including the plea of conscientious objection, are in substance those previously recognized by the professional committees. The status of the medical tribunal is in many respects that of an ordinary appeal tribunal, but the hearing of cases will follow the lines already laid down. An appeal on personal grounds against a decision may, however, be made to the Central Tribunal, with the leave of the medical tribunal, or on the recommendation of the Committee of Reference; but "it is not intended that cases shall come before the Central Tribunal unless important questions of principle are involved, or unless there is some other special reason why an appeal should be allowed."

With regard to the kind of exemption from military service which may be granted, the regulations include a special provision whereby exemption on occupational grounds shall, and on personal grounds may, be conditional on the practitioner undertaking such professional service and under such conditions as the Director-General of National Service may, after consultation with the medical tribunal and in concert with any Government department concerned, deem best in the national interests. This stipulation leads straight to the root of the whole matter, for it is evident that nothing short of national necessity could justify a measure which will at once be recognized as vocational conscription, howsoever cloaked in legal or departmental language. At the same time an official assurance has been given that "the regulation in question will be administered with the utmost consideration consistently with the national interests, and that any arrangements under it will be made in full consultation with the medical tribunal." For the enlightenment of those who have not closely followed the subject, the case can be briefly stated. It is held, and with good reason, that the medical profession is in a special position, the effect of which, however, cuts both ways. Doctors are so much in request, both for military and for civilian service, that the needs of the country can only be met by a carefully considered distribution of the medical personnel. Hence the necessity for a special medical tribunal to hold the balance between military demands on the one hand and civilian claims and personal objections on the other. Hence also the differential treatment of the medical profession in respect of the age limit for military service, and the "conditional exemption" which is all that most doctors of military age can look for from their professional tribunals. These and other aspects of the new legislation were considered by Sir Donald MacAlister in his presidential address before the General Medical Council, which we report in the SUPPLEMENT this week.

The procedure to be adopted, and the principles which underlie it, will perhaps be made clearer in the following way: While all medical men up to the age of 56 are liable to military service, it does not necessarily follow from the terms of the Act that they must be employed as doctors, however desirable that may be. The question before the medical tribunal will be the same as that before ordinary tribunals—namely, whether the individual shall serve in the army or shall receive exemption on one of the statutory grounds—occupation, personal hardship, ill health, or conscientious objection. Unless a case is made out on one or more of these grounds the medical man becomes liable to join the army, the disposal of his services resting with the military authority. But since the present shortage of doctors makes it inadvisable that a medical man should be employed in non-medical work, the authorities do not propose to call up doctors for service in the ranks provided that they undertake to render medical service either in a civil or a military capacity if called upon to do so by the Ministry of National Service after consultation with the professional committee. Civil medical service is understood to mean work of a medical nature either in the district in which the doctor lives or at a distance, undertaken with a view to setting free a younger or otherwise more suitable practitioner for military medical service.

We understand that, in order to carry out such rearrangements as are necessary with the least disturbance and friction, the Ministry of National Service proposes at the expiry of fourteen days' notice to issue a certificate of protection to every medical man of the new military age in respect of whom an application has not been made on personal grounds within that period. The effect of this procedure will be that each practitioner receiving a certificate is left to continue his present work unless and until he is called upon to serve in some other way. If he considers that he should receive some other form of exemption within the terms of the regulations he must within fourteen days send to the clerk of the appropriate medical tribunal notice to this effect, in which case his application will be heard by the tribunal in due course. If, however, he decides to accept the certificate of conditional protection he will be left to carry on his present work until such time as it appears

necessary to call upon him to serve in some other direction, either as a commissioned medical officer, or by taking over the work of a neighbour or neighbours under some scheme of local arrangement, or by being transferred to some other district where there are doctors more suitable for military service but who cannot under present conditions be spared from civil life. The possibility that he might be called upon to serve with the army in a non-medical capacity need only be considered in the case of a doctor who, being deemed surplus for the medical needs of his area, is unwilling to accept one of the three forms of service indicated above.

If and when the need arises for utilizing his services in one of these ways, the practitioner will be able to appear before the local or central professional body and state his reasons for not being assigned to the new duties required of him, in the same way as has hitherto been adopted in regard to enrolled practitioners. It will be noticed that the professional bodies recognized as medical tribunals under the regulations are assigned two distinct though related sets of duties—namely, the duties pertaining to an ordinary tribunal constituted to deal with claims for exemption from military service, and the duties of a body advisory to the Director-General of National Service in dealing at a later stage with the cases of doctors who have received certificates of conditional exemption under the proviso to Regulation 24.

PROTEIN "SHOCK" THERAPY.

ALTHOUGH some forms of treatment formerly empirical have now been sanctified by an explanation of their mode of action, an interesting essay might still be written on cures due to treatment logically inefficient or even smacking of quackery. Thus at a laparotomy on an acute abdomen nothing particular is found or done, and yet the patient seems to improve because of, rather than in spite of, the somewhat vigorous interference. Possibly in such cases the surgeon has operated better than he knew and unconsciously remedied some mechanical factor, such as a twist or adhesion, or conceivably an accessory factor in the ritual—such as the infusion of normal saline—has modified a general infection or toxaemia responsible for prominent abdominal symptoms. In tuberculous peritonitis the benefit from a simple laparotomy is clear to every surgeon, but the *modus operandi* perhaps concerns him less than the incision.

For a considerable time the thoughtful practitioner must have been perplexed by the success which undoubtedly may follow the injection of some preparations, such as polyglandular extracts, or vaccines and serums, that are multiple both as regards their derivation and the diseases for which they are recommended. In 1906 Montgomerie Paton advocated on clinical grounds the oral administration of antidiphtherial and normal horse serum in the treatment of various infective diseases, and stated that the resistance of the organism to infection was thereby increased. A little later horse serum was advocated by E. C. Hort in gastric and duodenal ulcer in virtue of its anti-autolytic action; later Hiss and Zinsser injected extracts of leucocytes in infectious diseases, and the nuclein treatment had a short vogue.

While the spirit of scientific medicine naturally views with suspicion therapeutic measures unsupported by reasoned exposition, it should always be ready to investigate with an open mind apparently haphazard methods of treatment so as to obtain a guide to future advance, for the germ of truth may remain hidden under obvious empiricism or quackery unless sought for. The logical attitude of practically restricting treatment to those forms that are demonstrably specific, mainly due to Ehrlich's and Sir Almroth Wright's exact methods, is now orthodox, and is perhaps the reason why the numerous researches and papers, especially those by Jobling and Petersen[1] on the non-specific factor in the treatment of disease and protein shock therapy, have received comparatively so little notice. Typhoid fever has been treated by intravenous injections of typhoid vaccine, of chicken serum, and of protease, and by intramuscular injections of boiled milk; and all these medicaments have been followed by a crisis and great improvement in the condition of those patients. Acute arthritis has likewise been cured by intravenous injections of typhoid vaccine (Miller and Lusk), and also by similar injections of albumose. In Culver's hands gonococcic arthritis reacted equally well to meningococcic vaccine and to gonococcic vaccine. Even more recently Cecil[2] has given a careful account of 40 cases of acute arthritis treated by intravenous injections of typhoid or gonococcic vaccine. Thirteen cases of rheumatic arthritis rapidly recovered after typhoid vaccine (in 8 cases one injection, in 4 two injections, and in 1 three), 20 cases (17 rheumatic fever) required salicylates as well, and all but 3 showed improvement while receiving the vaccine. Seven cases of acute gonococcic arthritis showed gradual improvement under vaccine treatment (3 gonococcic vaccine, 2 typhoid vaccine, 2 both), but it is cautiously added that it was impossible to say how far the vaccine was responsible. He concludes that this method is undoubtedly efficient in many cases of acute arthritis, but as the reaction is severe, unpleasant, and may be dangerous if the cases are not carefully selected, it should be advised only after salicylates and other well established means have failed.

It seems generally agreed that the beneficial results obtained by these methods of non-specific treatment depend roughly on the occurrence of a good reaction with shivering, fever, and perspiration. These surprising results suggest, at any rate in the case of arthritis, that the vaccine acts in virtue of the foreign protein it contains and not specifically. Hence the conception of non-specific protein "shock" treatment, or, as the subtitle of an article by L. D. Smith expresses it, "Allergy, a therapeutic agent." According to Jobling and Petersen a reaction to injection of a foreign protein, such as is contained in a vaccine, causes changes in the tissue cells, especially of the haemopoietic organs, and in the blood—namely, leucocytosis and fluctuations in the ferment-antiferment balance; during the protein shock a condition (low antiferment and increased protease) obtains which favours proteolytic activity such as would hydrolyze the toxic bacterial products to their lowest non-toxic forms, whereas after the reaction the reverse condition (increased antiferment and low protease) holds good. It may be mentioned that Sir Almroth Wright[3] found that the antitryptic power of the blood was increased after typhoid, streptococcic and staphylococcic vaccination, that this antitryptic power of the blood inhibits blood infection, and that vaccines may give some protection against diseases other than those they are designed to ward off.

In his most recent paper Petersen[4] quotes the work of Friedberger, Matthes, and Vaughan, to the effect

[1] J. W. Jobling and W. F. Petersen, *Journ. Exper. Med.*, Baltimore, 1914–15; also *Arch. Int. Med.*, Chicago, 1917, xix, xx.
[2] R. L. Cecil, *Arch. Int. Med.*, Chicago, 1917, xx, 951–963.
[3] A. E. Wright, BRITISH MEDICAL JOURNAL, 1915, ii, 632.
[4] W. F. Petersen, *Arch. Int. Med.*, Chicago, 1917, xx, 716–724.

that in infection no intoxication occurs until the host becomes sensitized to the bacterial protein; and that if, when this refractory or incubation period is finished, the patient is desensitized as the result of protein shock, the fever and other symptoms disappear though the micro-organisms remain, as has been shown in the case of typhoid fever. In order to cover this therapeutic conception of seeking to change the reacting powers of the host instead of modifying or destroying the invading parasite, the term "ergotropie" has been coined by von Groer. The mechanism, application, and limitations of non-specific protein treatment, and especially its relation to vaccine therapy, require much more investigation before its adoption in practice can be set on a firm basis; and, in any event, this new knowledge will in no way impugn the value of established specific remedies such as antidiphtherial, antitetanic, antimeningococcic, and antipneumococcic (type I), serums, quinine, salvarsan, and emetine. Petersen, who is investigating the subject further, concludes meanwhile that the good results of protein shock therapy should not be ascribed to any one alteration in the reacting organism but to a series of factors—namely, antibody and ferment changes in the serum, leucocytosis, fever, sweating, increased flow of lymph through the thoracic duct, and the cellular changes which are no doubt important though as yet intangible.

THE ARMY MEDICAL SERVICE IN FRANCE.

It has been announced by the Secretary of the War Office that the Army Council has not considered it advisable to extend the period of service of Lieutenant-General Sir A. T. Sloggett as Director-General. This decision, which the official announcement states is due to the fact that Sir Arthur Sloggett has completed the period of his appointment and passed the age limit for service on the active list, will be received with great regret by those who have served under him in France and recognize the great success of his administration. His successor as Director-General Medical Services, British armies in France, is Major-General C. H. Burtchaell, a medical officer who has had wide experience in India, in South Africa, and at home. Sir Arthur Sloggett's career has been one of very great distinction. He was a student of King's College, London, of which he is now a Fellow, and entered the Army Medical Service in 1881. Three years later he was serving on the Indian frontier, and in 1896 was senior medical officer of British troops with the Dongola Expeditionary Force. He served in the Sudan in 1897–98 and was dangerously wounded at Khartoum, being shot through the chest in the cardiac region. He made a complete recovery and served with great distinction in South Africa. Afterwards he was P.M.O. of Home and London Districts, and of the 6th Division in India. He became Director-General of Medical Services in India in 1911, and passed from that appointment to become Director-General A.M.S. at the War Office on June 1st, 1914. Since October, 1914, he has been in France as Director-General Medical Services of the British armies in that country. His administration has been conspicuously successful, largely, as we have on many occasions pointed out, owing to his appreciation of the importance of scientific methods in the prevention and treatment of disease, and his sympathy with the views and aspirations of the medical officers from civil practice who have served under his command. His successor, Major-General Burtchaell, graduated at the University of Dublin in 1889, and entered the army in 1891. He was through the North-Western Frontier campaign in India in 1897–98 and was present at all the principal actions, including the Dargai Heights, being promoted Major for his services in the field. He served throughout the South African war with Lord Methuen's command, being present at the actions on the Modder River and Magersfontein, and in 1902 was selected for appointment as principal medical officer to the South African Constabulary, a post he retained until 1905, when he rejoined the army. While serving on Headquarters Irish Command, 1907, he organized the experimental scheme of sanitary training for fighting troops, afterwards adopted for the army, and in the following year directed the medical service work of the first medical tour held in the British army. In 1910 he became Assistant Director-General, Army Medical Services, War Office, and continued to take special interest in arrangements for medical manœuvres and tours. He has served as Assistant Director-General Medical Services in France since October, 1914. He was promoted Colonel in March, 1915, and temporary Surgeon-General in October, 1917. His promotion was made substantive in the following December. For his services in the present war he has been mentioned seven times in dispatches, and has been awarded the C.B., the C.M.G., and the Legion of Honour. During his service in South Africa General Burtchaell came in contact with the Dominion forces for three years, and his association with them in France, especially with the Canadians, dates from 1915. The Canadians went into action at Ypres for the first time, and a correspondent tells us that in a situation which was strange and difficult the Canadian Medical Service felt that it could rely implicitly upon General Burtchaell's experience and sympathy, and that that sympathy has ever since grown more close.

MEDICAL MAN POWER IN THE UNITED STATES.

From editorial articles in the *Journal of the American Medical Association* of April 20th and 27th it is interesting to note that the medical profession in America is going through the same stages in relation to the war as was the case in this country. Thus, at the outset the Association offered its services to the Government, just as did the British Medical Association nearly three years before. In each case the volunteers were at first sufficient to cover the immediate needs. Now, as we recorded a fortnight ago (p. 569), Surgeon-General Gorgas has made a request for 5,000 more medical officers, just as in March, 1915, Sir Alfred Keogh, the Director-General A.M.S., asked for 2,000 The American Association, like the British Medical Association, has a War Committee, which is taking up this call with energy and enthusiasm. The Surgeon-General desires that the 5,000 volunteers shall be secured without serious hardship to any "community, manufacturing concern, or other civil activity," and consequently the American Medical Association has begun to investigate the position in all parts of the country, so as to produce a survey which will "provide a basis for active, intelligent, co-operative effort." In contemplating the problem of supplying not only the immediate, but also the future needs, the War Committee deliberated on the advisability or necessity of calling for a "voluntary draft" of all medical men under 55 years of age. This would mean that every medical man in active practice would volunteer as a member of the Medical Reserve Corps and be subject to call for such military or civilian duty as he may be deemed best qualified to discharge and as conditions and necessities may require. In other words, a scheme of enrolment or "voluntary conscription" was mooted, but of wider scope than the enrolment scheme of the Central Medical War Committee, inasmuch as it included enrolment for civil work, and was applicable to men of a higher age. The American Medical Association has deemed this extreme measure unnecessary for the present at least, but the organization of such a scheme would have afforded excellent training for the work the Association will have to face if ever it becomes necessary in America to pass a Military Service Act in any way comparable to that which has been found necessary in Great Britain. Though the

number of medical practitioners in America is large—the Association itself can boast 81,000 members—there is reason why organization for civil as well as military necessities, such as is contemplated in this country by the Ministry of National Service, will be required at a relatively earlier date in the United States. For, unlike ours, the main American army is fighting some thousands of miles from its own country. The bulk of its hospitals must be in Europe, so that the proportion of doctors to troops must be considerably greater than with us. Finally, our contemporary asserts that "the time has come for every medical man under 55 years of age, who is physically qualified, to consider seriously for himself the question of his duty to his Government." We have always held that no individual practitioner can possibly judge for himself the medical needs of the community in which he practises, or the hardship which he himself will suffer. For these reasons we are convinced that unless the war ends speedily the War Committee of the American Medical Association might have been better advised to take the matter in hand at once; it would at least have gained experience and much valuable information from the experiment. The magnitude of the work undertaken by the medical department of the American army during the first year may be judged from a few statistics. Thus the number of military hospitals in the United States has been increased from seven to fifty-three, with a bed capacity of 58,400, and in France from nothing to a bed capacity of 25 per cent. of the strength of the expeditionary force. The number of medical officers has been increased from 900 to 19,000, and that of nurses from 375 to 7,000. The laboratories have been increased from 112 to 650. The medical department has examined more than 2,000,000 men. The death-rate from disease has been 6.6 per 1,000, which is lower than the death-rate for men of the same age in civil life.

THE REGISTRATION OF UNIVERSITY ELECTORS.

THE appeal now being made to graduates serving overseas to register as electors of universities, and the suggestion that relatives of such graduates as may not be following events at home, should obtain forms for them, carries an important reminder of the right of voting by proxy, which may be exercised at a general election if circumstances prevent the ordinary course being taken. The procedure for university elections is under the direction of the governing body of the university, but its operation has been very carefully defined in the new Act. Voting papers, as previously, take the place of ballot papers. In an election they can be delivered by the voters personally or by post. The form of the paper is set forth in the statute. It includes a declaration by the elector, and a declaration by a witness that the signatory is personally known to him. Provision is made under Section 36 of the Act that persons entitled to vote in university elections may do so by proxy, when their position is the same as that of persons entitled to vote by proxy in other parliamentary elections. To enable voting by proxy in elections other than those of universities a returning officer must prepare an "absent voters' list"; but the registrar of a university is not required to do this—the right to vote by proxy is recognized as if such an absent voters' list had been prepared; the fact that voters have to register—the electorate for the time being thus constituted—is obviously deemed sufficient to enable the issue by the registrar of proxy forms as they may be asked for from the roll he has thus obtained. The provision as to absent voters is set out in Clause 23, which in effect provides that an Order in Council may direct that voting by proxy by naval or military voters shall be permitted in any area on land abroad mentioned in the Order if it appears that "ballot papers" (in the case of university electors "voting papers") cannot reasonably be returned before the votes are counted. The right to vote by proxy also applies, in limited degree, to the merchant service and to fishermen. No person is allowed to vote for more than two absent voters unless this person be husband, wife, parent, brother, or sister of the elector. It is the duty of the registration officer (in the case of universities it is the registrar's duty), on any application for a proxy paper, to issue it to the applicant or to some person on his behalf if satisfied that the person concerned is registered and entitled to appoint a proxy. This paper is to remain in force during the continuance of the present war or for a period of twelve months afterwards unless cancelled. A proxy paper may be cancelled by an elector who gives notice in prescribed form. But the one essential matter for the moment is to register. The method of voting—by voting paper by post, or by proxy paper, as explained—is determined later, according as circumstances may require.

ACTION OF ANTISEPTICS ON BACTERIAL TOXINS.

THERE is little evidence at present that antiseptics can exert a destructive action on bacterial toxins, and in a preliminary note on this question Taylor and Austin[1] have related experiments with the soluble exotoxin of *Bacillus welchii*, the virulence of which Bull and Pritchett standardized. Having obtained a standardized toxin, inactivated horse serum and the antiseptic to be tested were added, the latter remaining in contact with the toxin for five minutes before the mixture was injected into the pectoral muscles of a pigeon. The series of experiments showed that Dakin's hypochlorite and chloramine-T solutions will protect pigeons against multiple fatal doses of the *B. welchii*, whereas phenol 0.25 per cent. has no such action. These observations are not recorded with the intention of advocating the use of an antiseptic in place of the specific antitoxin described by Bull and Pritchett; the authors hold that in human surgery the antiseptic treatment of an infected wound should be combined with specific serum therapy. This preliminary paper has a bearing on a wide conception, which is a division of antiseptics into two groups: (1) such as phenol, possessing bactericidal power but little or no destructive influence on the products of bacterial activity, and (2) such as the chlorinated antiseptics, attacking chemically both the bacteria and their products, and, by an alteration or disintegration of the molecules of the latter, altering their properties and rendering them inert. As Dakin pointed out, the chlorinated antiseptics effect this by their affinity for the amino group of the protein molecule.

GERMAN EXPERIENCES OF GASSING.

AT a meeting of the Hamburg Medical Society last year Dr. Knack[2] gave an account of the symptoms observed in cases of gassing. In several the acute symptoms were followed by marked general weakness, bouts of coughing, scanty mucous expectoration, and dull dragging pain in the chest. The *x* rays showed increased pulmonary markings, as observed in chronic bronchitis, while old tuberculous foci were apt to be stirred up. Two patients had recently been received from the Western front suffering from the effects of an unknown gas, liberated by the explosion of gas bombs thrown at a distance of 80 to 100 metres. The gas had a musty smell, tasted sweet, and was invisible. Its action was so rapid that most of its victims had not time to put on their gas masks. Many soldiers had died in a few minutes, convulsed. He showed two soldiers who had been gassed. They were unconscious for some hours, and had suffered for several days from violent vomiting. The respiratory symptoms were insignificant. After about fourteen days the legs became painful, and the patients felt giddy and rolled about when walking. A moderate degree

[1] H. D. Taylor and J. H. Austin, *Journ. Exper. Med.*, Baltimore, 1918, xxvii, 375–381.
[2] *Deut. med. Woch.*, September 27th, 1917.

of polyneuritis was demonstrable; the reflexes were weak and the large nerve trunks were very tender. The *x* rays showed increased pulmonary markings—evidence of peribronchitis. Lymphocytosis of 46½ per cent. was found, but neither in the blood nor urine could any pathological chemical substance be found by spectroscopic or other tests. Both patients had been slightly febrile for a considerable time. Another patient had been unconscious for several days after being gassed and had developed paralysis of the left arm and paresis of the left leg. Babinski's sign was present. The paralysis soon passed off completely, but the man was insane for a long time, passed faeces and urine involuntarily, and had not completely recovered. In this case also the result of search for a chemical poison was negative; only a trace of bile pigment could be found in the serum. Though in this case, too, the composition of the gas was unknown, Dr. Knack observed that the mental disturbances and the paralyses were suggestive of carbon monoxide poisoning.

THE REPORTED EPIDEMIC IN SPAIN.

THE new conditions produced by war both at the front and in the civilian population, especially from the altered circumstances of diet, hygiene, and occupation, have led to the appearance of a number of fresh diseases. This extremely interesting subject has naturally attracted much attention, and at the present moment the cases recently described as botulism, polioencephalitis, and lethargic stupor are being keenly investigated. As novelty has specially attracted the public since, and probably before, the time of the Athenians, there is obviously a temptation for the press to publish early accounts of new diseases. Thus in the *Times* of May 28th King Alfonso is stated to have fallen a victim to a new disease which has attacked approximately 30 per cent. of his subjects. The symptoms are said to be high fever, vomiting, pains in the chest, and diarrhoea. So far there have been no fatal cases. The *Daily Mail* of the same date speaks of "a mysterious epidemic," and the *Morning Post* of "this new and strange outbreak, the germ of which has not yet been discovered." Pending further information it seems not improbable that this acute catarrhal disease is what we are accustomed to speak of as "influenza," and that in Spain now the gastro-intestinal form is prominent. During the month of May there has been a severe outbreak of influenza in a certain district of this country, recalling in the extreme suddenness of its incidence the beginning of the epidemic of 1889-90. The papers also report an outbreak of influenza among the German troops as one of the reasons to account for the delay of the recent offensive. The reference in the *Times* to the "plague of 1889" is very probably a reporter's error for the pandemic of influenza in that year, for there was no bubonic plague then in Spain. We cannot help feeling that in the absence of any bacteriological proof, the extreme low mortality or its practical absence, and the possibility that the disease is gastro-intestinal influenza, render alarmist suggestions premature, and they do not seem to be countenanced by the medical profession in Spain. The question of a pandemic of influenza is a sufficiently serious one, and on the grounds of probability should be excluded before a scare of cholera is raised.

HEALTH OF THE TURKISH ARMY.

LAST autumn Dr. His[1] gave the Medical Society of Berlin an account of the health conditions of the Turkish army. The organization of the army medical service was, he said, based on the German model; most of the civilian practitioners serving in the army had received their medical education in the French Jesuit school or in the American college in Beirut, where one British and one American doctor were still working. The nursing staff was recruited from Christians and Jews, as Mohammedan women had not yet undertaken nursing. Baths and other appliances for combating lice were provided at all the military centres. Tetanus and gas gangrene were rare, owing, His thought, to the powerful insolation of the soil. The Turk was far more subject than the German to relapsing fever; the disease responded satisfactorily to salvarsan unless complicated by severe jaundice or symptoms of dysentery. In Constantinople amoebic and bacillary dysentery were equally common; in Asia Minor and Palestine the dysentery was amoebic only. Emetine had maintained its good reputation, and abscess of the liver was rare. Salvarsan had proved beneficial in tertian malaria only, and even in such cases was inferior to quinine. Pappataci fever was particularly prevalent in Aleppo. Typhoid fever was rare; a septic paratyphoid A infection was more common. Paratyphoid inoculation had proved harmless and apparently successful. Typhus fever was frequent at the early stage of the war only, and Turks and Arabs had suffered from the same death-rate as the Germans (12 to 15 per cent.). Weil's reaction had proved of diagnostic value. Gangrene, which in 1915 had been a common complication of typhus, had become very rare, though the reason was not known. Vincent's angina was strikingly common, but only among the Turks; it yielded to local treatment with salvarsan. This drug also proved useful in pyorrhoea alveolaris and noma. Scarcely two dozen cases of war nephritis were observed in the whole field of operations. "War oedema" resulting from a diet restricted to bread and olives disappeared when vegetables were added to the dietary. Nervous disorders of heart and stomach and the host of other neuroses were practically unknown in Turkey, a circumstance which Dr. His attributed to lack of compensation and provision for such cases.

[1] *Deut. med. Woch.*, November 15th, 1917.

PROFESSOR HARVEY CUSHING.

AT a meeting, on May 25th, of the Royal College of Surgeons in Ireland, which was attended by the Lord Lieutenant, Mr. Walter Long, M.P., and the Lord Chancellor of Ireland, the honorary fellowship was conferred upon Major Harvey Cushing, the eminent professor of surgery in the University of Harvard, who from an early date has rendered great services to the British and now to the American armies in France. In acknowledging the honour, Major Cushing said that he recognized it as an act of friendship towards his own country. America had realized that there was an insane nation embroiling the world by unbelievable ambition, and using every unbelievable means to attain its end. America was not in favour of half measures, and the universal feeling of its people was that they were in to stay to the end. After saying that America's neighbour, Canada, also was in as a country, he continued, "You here in this beautiful land are the next people to us, and we expect you to be in as a country, and you certainly will." After paying a high tribute to the gallantry of the Irish regiments in the war, he expressed the hope that the time was coming when there would be in Ireland a period of national service to help towards the smoothing out of those difficulties which must arise in every country. Such a period would awaken in the people a sense of that devotedness which could only come to them through service rendered to their country. Professor Harvey Cushing was elected an Honorary Fellow of the Royal College of Surgeons of England in 1913.

GERMAN BOMBING OF HOSPITALS.

MR. BONAR LAW, when asked at the opening of Parliament to make an official statement as to the bombing of hospitals by Germans on the Western front, said that a raid was carried out on the night of May 19th-20th against Etaples, where are a large number of hospitals; over 300 casualties were caused to hospital patients. He added that a full report on the subject had not yet been received.

Perhaps it may be proper, or at least charitable, to suspend judgement, and not to attach too much importance to the statement of the captain of the Gotha which was brought down, to the effect that hospitals should not be placed near railways, and that if they were the consequences must be taken. The raid began at ten in the evening and lasted nearly three hours. A short interval about 11.30 is held to make it probable that two separate squadrons were employed, numbering between them over a score of machines. The dunes north of the village of Etaples are not exclusively given up to hospitals, but the hospitals occupy a compact area and are close together. It was over this area that the German aeroplanes circled, dropping bombs, setting quarters on fire, and causing many casualties as Mr. Bonar Law stated. The other military establishments in the neighbourhood which might have been legitimate objects of the raiders seem to have escaped, but upon this point no definite information is available. At the same time it must be remembered that strong evidence was advanced last October that the German airmen deliberately engaged in the bombing of advanced hospitals both of the British and French armies on the Western front. The French authorities were absolutely convinced of the truth of this charge, and the story as told by them left little room for doubt.

A MONTHLY REVIEW OF THE FOREIGN MEDICAL PRESS.

ONE of the tasks of the General Staff at the War Office during the war has been the issue of a daily review of the foreign press, the scope of which has been extended from time to time by the preparation of supplements dealing with special subjects. A monthly medical supplement, compiled by the Medical Research Committee, was added to the list in January last, and since then has been widely circulated through official channels for the assistance of naval and military workers, and particularly among the British and American Expeditionary Forces. It has been warmly welcomed by those entitled to receive it, but its usefulness has been limited hitherto by the fact that it has been inaccessible to many medical men to whom it would be of interest. This limitation has now been removed by the decision to place the medical supplement on sale, and the June and subsequent numbers will be obtainable from H.M. Stationery Office, either direct or through any bookseller, at the cost of one shilling.

THE Croonian Lecture before the Royal Society will be delivered by Major W. B. Cannon, Professor of Physiology, Harvard, on Thursday, June 20th, at 4.30 p.m., the subject being the physiological basis of thirst.

Medical Notes in Parliament.

Ministry of Pensions.

THE first day of Parliament, when it reassembled on May 28th, was given to a discussion of the administration of the Ministry of Pensions.

The Minister, Mr. Hodge, in his opening statement, said that progress had been made in the organization of the department and that the staff had been largely increased. He took credit to himself for having recognized that the supervision of the work of restoration of disabled pensioners called for expert advice and that he had in consequence started a medical service department; since its staff had been completed the developments had been exceedingly great. Instead of concentrating the orthopaedic treatment in two or three centres the principle of decentralization had been adopted, and it was hoped to have an orthopaedic clinic in all towns, his view being that the more the facilities were brought to the door of the men, the more likely would they be to avail themselves of the opportunities. The Ministry was greatly indebted to many physicians and surgeons for the disinterested voluntary services they had rendered not only in respect of orthopaedics, but also as regards those diseases which came more under the notice of the physician. Another department had been established for artificial limbs, including an experimental laboratory where all so-called new inventions could be exploited for the benefit of the disabled. The artificial limb makers of the United Kingdom had fallen in with the scheme, and were now prepared to make to the specification of the Ministry any limb which the Advisory Committee decided was the best. In regard to hospital accommodation, the Ministry was dependent upon the assistance of other Government departments. The Ministry was greatly indebted to the British Red Cross, and he regretted to have to differ from it with regard to the use of the Golders Green institution for shell shock cases. Down to the end of April the number of disabled men who had received pensions was 341,025, this number including officers and men of the army, and officers, warrant officers, petty officers, and men of the navy. The percentages of certain injuries were as follows:

Eyesight cases	2.8 per cent.
Wounds and injuries to legs necessitating amputation	2.6 "
Wounds and injuries to arms necessitating amputation	1.4 "
Wounds, etc., to legs not necessitating amputation	11.9 "
Wounds, etc., to arms not necessitating amputation	8.45 "
Wounds, etc., to hands not necessitating amputation	4.45 "
Wounds, etc., to head	4.0 "
Hernia	0.8 "
Miscellaneous wounds and injuries	5.55 "
Chest complaints and tuberculosis	11.6 "
Rheumatism	6.5 "
Heart disease	10.3 "
Epilepsy	1.0 "
Nervous diseases, shell shock, neurasthenia, etc.	6.0 "
Insanity	0.75 "
Deafness	2.0 "
Frostbite, including cases of amputation of feet or legs	0.9 "
Miscellaneous diseases, including Bright's disease, debility, gastric ulcer, varicocele, enteric, malaria, spinal disease, and appendicitis	18.36 "

The Ministry had endeavoured to set an example to other Government departments by employing disabled men, and now had between two and three hundred so employed. The armless men would probably be the greatest difficulty in the future, and out of seventy messengers employed by the Ministry, 55 were one-armed men. Mr. Hodge appealed to public authorities who required messengers to give the preference to one-armed men.

The subsequent discussion, which was interrupted by an attempt to count the House out, turned chiefly upon rates of pension. In his reply Sir A. Griffith-Boscawen again insisted that the amount of a man's pension did not depend upon his earnings; it was fixed simply and solely on the degree of his physical disablement. Medical boards were not authorized to ask a man what he was earning.

Registrars of Military Hospitals.—Major David Davies asked, on May 28th, whether, in order to utilize the services of doctors in the R.A.M.C. to the fullest extent, officers not belonging to the R.A.M.C. declared to be unfit for general service would be appointed as registrars of military hospitals and convalescent establishments. Mr. Macpherson replied that the duties of registrars of military hospitals included those of a purely professional nature, and it was not considered that such posts could be efficiently filled by officers other than those in the R.A.M.C.

ALTHOUGH the date for publication of the new electors' list under the Reform Act has been postponed from June 15th to June 29th, it is understood that every effort is to be made to secure that the Register comes into force on the date originally fixed—October 1st. In a recent debate in the Commons the President of the Local Government Board (Mr. Hayes Fisher) expressed grave doubts whether this could be done; but the word has now gone forth that the Register is to be available on October 1st. To make it at all satisfactory the local authorities will probably have to proceed with house-to-house inquiries in many cases to obtain the necessary information. The life of the present Parliament expires in July, and an extension of its existence by a short bill will again, of course, become necessary.

THE WAR.

CASUALTIES IN THE MEDICAL SERVICES.

ROYAL NAVY.

Killed in Action.

TEMPORARY SURGEON A. L. PEARCE GOULD, R.N.

Surgeon Alfred Leslie Pearce Gould, R.N., attached to the Royal Marine Light Infantry, Royal Naval Division, was killed in action on Whit Sunday, May 19th, aged 31. He was the youngest son of Lieut.-Colonel Sir Alfred Pearce Gould, K.C.V.O., R.A.M.C.(T.F.), and was educated at Christ Church, Oxford, where he gained a classical scholarship, and graduated B.A., with first class honours in natural science, in 1909, and M.A., M.B., and B.Ch. in 1913; and at University College Hospital, where he won the Erichsen prize in practical surgery in 1913, and the Atchison scholarship in 1914, taking the M.R.C.S. and L.R.C.P.Lond. in 1913, and subsequently the F.R.C.S. in 1916, and filling the posts of house-physician and obstetric house-physician. He was appointed house-surgeon to Mr. Trotter, but the outbreak of the war prevented his entering upon this post. In 1916 he obtained the higher degrees of M.D. and M.Ch., and in the following year he was elected to a Radcliffe Travelling Fellowship of the University of Oxford. During the war he published several papers on clinical subjects.

The Director-General of the Medical Department R.N. states that Surgeon Pearce Gould's work was greatly appreciated in the navy, and that his loss will be very keenly felt both from the point of view of his professional capabilities and because he was such a cheery messmate.

Temporary Surgeon-General Rolleston, R.N., writes: Since the outbreak of war in August, 1914, when we were messmates at the Royal Naval Hospital, Haslar, I had seen much of Leslie Pearce Gould, and learnt to admire his sterling qualities as a straight, clean English gentleman. His life's motto might well have been, "Whatsoever thy hand findeth to do, do it with thy might," for both his work and play reflected this. Among the first to volunteer as a temporary surgeon on August 3rd, 1914, he had a varied experience; but when, after being invalided from the Mediterranean with enteric, he was established at the Royal Naval Hospital, Plymouth, in a post which gave his surgical talents full scope and opportunities, he soon began to feel that he ought not to have such a job when others were bearing the brunt and dangers of active service at the front. After some delay and consideration he asked to be transferred to the Royal Naval Division on the Western front, though it was pointed out to him that the work he could expect there was hardly likely to be so useful as that he was doing at Plymouth. It was impossible not to honour the motives dictating a step destined, as it turned out, to cut short so lamentably a life of the greatest promise. With a broad outlook on medical science he would have made a real physician, but he had already decided on a surgical career and had laid the surest foundations for the highest kind of success.

Accidentally Injured.

Surgeon Probationer G. R. Falcon, R.N.V.R.

Prisoner of War.

Surgeon H. C. Broadhurst, R.N. (temporary).

ARMY.

Killed in Action.

CAPTAIN ST. J. A. M. TOLHURST, N.Z.M.C.

Captain St. John Alexander Molesworth Tolhurst, New Zealand Medical Corps, was killed in action on May 12th. He was the youngest son of George Edmeades Tolhurst, of the Union Bank of Australia, Wellington, New Zealand, and was educated at the college in that city, and at Guy's Hospital, where he was captain of the Rugby fifteen. He took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1907, and graduated M.B. and B.S.Lond. in 1909. After acting successively as out-patient officer, house-physician, and assistant house-surgeon at Guy's, he returned to New Zealand, and went into practice at Wellington, where he was honorary physician to the hospital. He joined the New Zealand forces at the beginning of the war, and served in the New Zealand hospital ships *Mahena*, at Gallipoli, and *Marama*, and afterwards with the 3rd N.Z.F.A, and with the New Zealand infantry. He was killed while working in an aid post.

Died of Wounds.

MAJOR J. B. METCALFE, D.S.O., M.C., A.A.M.C.

Major James Beverley Metcalfe, whose death from wounds we recorded in our issue of May 18th, was the son of the late Dr. Metcalfe of Norfolk Island, and was born on January 13th, 1888. He studied medicine at the University of Sydney, where he graduated with distinction M.B., Ch.M. in 1911. After a year as resident medical officer at the Royal Prince Alfred Hospital, Sydney, he started in private practice in Wellington, N.S.W. He was a great sportsman, and represented his university at football and tennis. Having joined the A.I.F., he proceeded to France early in 1916, and was awarded the M.C. for gallantry in the field in October of the same year, receiving his promotion to the rank of major on January 29th, 1917. After serving as battalion medical officer, and also in a field ambulance, he was appointed D.A.D.M.S. Australian Corps, and while acting in this capacity was wounded near Ypres in October, 1917. He proceeded overseas again at the end of last March, and was in charge of an advanced dressing station on the river Ancre on April 24th. In consequence of heavy shelling the dressing station had to be evacuated, but Major Metcalfe returned to dress a "casual," when two shells exploded, inflicting fatal injuries. For his gallantry on this occasion he received a posthumous award of the D.S.O. Major Metcalfe combined an artistic temperament with sound common sense, and was deservedly popular with his senior officers and the men who worked under him. Brave almost to rashness, he had administrative and professional abilities above the ordinary, and was a good soldier and a gallant gentleman.

CAPTAIN D. H. HALL, R.A.M.C.

Captain David Henry Hall, R.A.M.C., was reported as having died of wounds, in the casualty list published on May 24th. He was educated at Trinity College, Dublin, where he graduated M.B. and B.Ch. in 1915, after which he took a temporary commission in the R.A.M.C., and was promoted to captain after a year's service. He was attached to the Seaforth Highlanders.

Died on Service.

DR. R. W. SPENCE.

Dr. Reginald Westmore Spence died of blood poisoning, on service in East Africa, on May 19th, aged 31. He was the eldest son of Mr. Ernest Spence of Guildford, and was educated at Westminster Hospital, taking the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1913.

Wounded.

Lieut.-Colonel D. Ahern, D.S.O., R.A.M.C.
Lieut.-Colonel W. H. Burney, R.A.M.C.
Major N. W. Kidston, R.A.M.C.(T.F.).
Captain R. J. Aherne, R.A.M.C. (temporary).
Captain L. H. H. Boys, R.A.M.C. (temporary).
Captain A. Buchanan, R.A.M.C. (temporary).
Captain H. E. Cresswell, M.C., R.A.M.C. (temporary).
Captain F. R. M. Heggs, R.A.M.C.(T.F.).
Captain H. Mendelssohn, Australian A.M.C.
Captain W. H. Morrison, R.A.M.C. (T.F.).
Lieutenant T. W. Shaw, R.A.M.C. (temporary).

Prisoners of War.

Captain J. B. Ball, R.A.M.C. (temporary).
Captain S. J. Darke, M.C., R.A.M.C. (temporary).
Captain W. J. Isbister, M.C., R.A.M.C. (temporary).
Captain S. V. P. Pill, R.A.M.C. (temporary).
Captain J. R. H. Ross, M.C., R.A.M.C. (temporary).
Captain J. Sullivan, R.A.M.C. (temporary).
Lieutenant E. M. P. Maitland, R.A.M.C. (temporary).

DEATHS OF SONS OF MEDICAL MEN.

Blurton, Gril Evers, Second Lieutenant Sherwood Foresters, younger son of Dr. Blurton, West Bridgford, Nottingham, reported missing on October 22nd, 1917, now known to have been killed in action on that date, aged 20. He was educated at Sedbergh School and Sandhurst, obtained his commission in October, 1916, and went to France in December of that year. He had previously been wounded.

Clare, Horace Townsend, Captain Royal Field Artillery, youngest son of Dr. Henry L. Clare, late Surgeon-General,

Trinidad, killed April 29th, aged 21. He was educated at Haileybury, entered Woolwich in 1913, and got his first commission on November 17th, 1914. He served in Gallipoli, in the 29th Division, till the evacuation, was mentioned in dispatches, and promoted to lieutenant in the R.H.A. He afterwards served in Egypt and in France, and took part in the long battle on the Somme in 1916, after which he was invalided. He returned to France in June, 1917, was wounded at Monchy-le-Preux, but returned to duty in October; was promoted to captain R.H.A. on November 1st, 1917, and to acting major R.F.A. on March 29th, 1918.

Dodgson, Edward Hughes, younger son of the late Dr. Dodgson of Cockermouth, died of wounds at a casualty clearing station on May 3rd.

Mitchell, E. P. H., Second Lieutenant Border Regiment, only son of Dr. Mitchell of Ambleside, was accidentally killed while flying abroad on May 7th, aged 20. He was attached to the Royal Air Force as instructor in aviation.

Swift, Neville Copley, M.C., D.S.O., Captain East Lancashire Regiment, youngest son of Dr. H. Swift, senior physician to the Adelaide Hospital, South Australia, died of wounds on March 28th, aged 23. He was educated at St. Peter's College, Adelaide, and served two years in the Australian militia, rising to the rank of lieutenant. He came to England in 1915, and, after a course of instruction at Sandhurst, obtained a commission in the East Lancashire Regiment. He was wounded in France in August, 1916, and again in 1917, and was awarded the Military Cross in December, 1917, when in command of a company with the rank of captain. In January, 1918, he gained a bar to the Military Cross while acting as major and second in command of a battalion, and was recommended for the D.S.O. He was wounded on March 27th while leading his battalion in a counter attack, and died the next day in hospital.

Wilkinson, Arthur W., Captain West Yorkshire Regiment, second surviving son of Dr. Wilkinson of Tynemouth, died from wounds received in action on April 18th. He was born in 1884, educated at Epsom College, and was practising as an architect in 1914 when the war broke out. He obtained a commission in the 9th Durham Light Infantry in 1908, but transferred in 1915 to the special reserves of the West Yorkshire. On July 1st, 1916, he was shot through the right lung, but recovered, and returned to France in 1917.

MEDICAL STUDENT.

Allardyce, George Gilmour, Second Lieutenant Australian Infantry, eldest son of Mr. George Allardyce of Rathgar, Dublin, died on May 18th at Somerville Hospital, Oxford. He was a second-year medical student at Trinity College, Dublin. His younger brother, William Swirles Allardyce, was lost at sea in December, 1916, as the result of a collision, while serving as a surgeon probationer.

[*We shall be indebted to relatives of those who are killed in action or die in the war for information which will enable us to make these notes as complete and accurate as possible.*]

HONOURS.

MENTIONED IN DISPATCHES.

THE following officers of the medical services are mentioned by Sir Douglas Haig in his dispatch dated April 7th, 1918, for distinguished and gallant services and devotion to duty between September 25th, 1917, and February 25th, 1918:

ARMY MEDICAL SERVICE.

Head Quarters Staff.

Lieut.-General Sir A. T. Sloggett, K.C.B., K.C.M.G., K.C.V.O.

Major-Generals: C. H. Burtchaell, C.B., C.M.G., Sir W. G. Macpherson, C.B., K.C.M.G., H. N. Thompson, C.B., C.M.G., D.S.O.

Surgeon-General M. W. O'Keefe, C.B.

Colonel (temporary Surgeon-General) B. M. Skinner, C.B., C.M.G., M.V.O.

Colonels: H. A. Bray, C.M.G., R. W. Clements, D.S.O., W. E. Hudlestone, D.S.O., Sir W. B. Leishman, C.B., F.R.S., S. Macdonald, C.B., C.M.G., F. J. Morgan, C.M.G., D. M. O'Callaghan, C.M.G., G. St. C. Thom, C.M.G.

Lieut.-Colonels (temporary Colonels): H. Collinson, D.S.O., R. S. H. Fuhr, C.M.G., D.S.O., J. S. Gallie, D.S.O., J. Grech, D.S.O., L. Humphry, C.M.G., E. M. Morphew, D.S.O., G. J. A. Ormsby, D.S.O., A. G. Thompson, D.S.O.

Lieut.-Colonels and Brevet Colonels: T. W. Gibbard, K.H.S. (temporary Colonel), A. J. Macnab, I.M.S.

Lieut.-Colonels: W. R. Blackwell, T. A. Granger, I.M.S., H. C. R. Hime, D.S.O., J. F. Martin, C.M.G.

Major (temporary Colonel) C. H. Lindsay, C.M.G.

Majors (temporary Lieut.-Colonels): E. T. Potts, D.S.O., D. P. Watson.

Major (acting Lieut.-Colonel) P. Davidson, C.M.G., D.S.O.

Majors: R. B. Black, D.S.O. (R. of O.), A. C. Turner.

Captains: L. G. Bourdillon, D.S.O., M.C., A. D. Child, (S.R.), K. K. Drury, M.C. (S.R.), T. I. Dunn, M.C. (S.R.), A. H. Heslop, D.S.O., J. G. McCutcheon, (S.R.), O. W. D. Steel, M.C., L. R. Tosswill.

Temporary Captains: J. Biggam, M. du B. Ferguson, R. E. Gibson, S. S. Greaves, M.C., H. G. Kilner, G. Rankine, M.C., R. H. G. Weston.

Consultants.

Temporary Major-Generals: Sir A. A. Bowlby, K.C.M.G., K.C.V.O., Sir J. R. Bradford, C.B., K.C.M.G., F.R.S., Sir B. E. Dawson, C.B., G.C.V.O., C. S. Wallace, C.M.G.

Colonel E. M. Pilcher, D.S.O.

Temporary Colonels: O. W. Richards, D.S.O., T. Sinclair, C.B., Sir A. E. Wright, C.B., F.R.S.

Lieut.-Colonel (temporary Colonel) W. Thorburn, C.B.

Majors (temporary Colonels): G. E. Gask, D.S.O., H. McI. W. Gray, C.B.

Major (temporary Lieut.-Colonel) H. A. Ballance.

Major R. H. Cooper.

Captain (temporary Colonel) A. E. Webb-Johnson, D.S.O.

Captain (temporary Lieut.-Colonel) A. E. Watson, D.S.O.

Royal Army Medical Corps.

Lieut.-Colonel (temporary Colonel) J. A. Hartigan, D.S.O.

Lieut.-Colonels: A. E. Hamerton, D.S.O., J. Powell.

Temporary Lieut.-Colonels: C. G. Douglas, M.C., W. J. R. Eames, C.B., V.D. (Lieut.-Colonel A.A.M.C.), A. Martin-Leake, V.C., Guy N. Stephen.

Temporary honorary Lieut.-Colonel H. Cabot.

Majors (temporary Lieut.-Colonels): R. C. Hallowes, T. R. Harty, D.S.O., W. J. S. Harvey, D.S.O., A. C. Osburn, D.S.O.

Majors (acting Lieut.-Colonels): C. G. Browne, D.S.O., J. Dalrymple, G. D. Gray, R. P. Lewis, C. D. Myles, H. C. Sidgwick, W. L. Steele, C. H. Turner, D.S.O., T. B. Unwin, W. J. Waters.

Majors: T. S. Coates, R. H. Cooper, J. E. Hoar, J. L. Loudon, M. Sinclair.

Temporary honorary Major L. F. B. Knuthsen.

Captain (temporary Lieut.-Colonel) F. W. M. Cunningham.

Captains (acting Lieut.-Colonels): W. W. Boyce, C. Clarke, R. Hemphill, A. N. R. McNeill, T. B. Nicholls, J. J. O'Keefe, M.C., C. Scaife, E. W. Wade.

Captains: W. P. Mulligan, W. G. Mumford, E. Phillips, M.C., W. L. Webster.

Temporary Captain (temporary Lieut.-Colonel) C. D. Pye-Smith, D.S.O., M.C.

Temporary Captains (acting Lieut.-Colonels): R. E. Drake-Brockman, A. Jones, M.C., L. D. Shaw, D.S.O.

Temporary Captains: J. Alexander, A. S. K. Anderson, D.S.O., M.C., J. S. Arkle, C. C. Austen, T. B. Batchelor, W. C. Blackham, A. D. Blakeley, C. F. Brady, G. M. Brown, J. P. Cahir, S. B. B. Campbell, T. H. Campbell, H. Caplan, F. F. Carr-Harris, D.S.O., M. T. Cassidy, A. W. S. Christie, C. J. W. Clayton, C. G. Colyer, J. A. Conway, M.C., G. M. Cowper, W. Crabtree, J. Crawford, J. Cruickshank, G. D. Eccles, J. A. Edmond, H. Emerson, M.C., C. C. Forsyth, D. S. Graham, H. B. Graham, D.S.O., A. Gray, C. Harris, F. W. Hird, L. C. Johnson, W. D. Kennedy, P. J. Lane, R. M. Lang, R. D. Lemon, G. A. Lilly, S. J. L. Lindeman, W. H. Lister, D.S.O., M.C., A. L. Lockwood, M.C., P. A. MacCallum, S. E. McClatchey, J. W. Macfarlane, M.C., R. McGrath, R. A. MacNeill, A. C. B. MacMurtrie, W. R. P. McNeight, A. F. Mavety, D. M. Morison, J. Morrison, H. H. P. Morton, G. E. E. Nicholls, F. E. L. Phillips, J. G. Pigott, J. A. Pringle, J. Proctor, C. R. Reckitt, W. G. Riddel, A. C. Rowswell, C. Scales, D. S. Taylor, G. W. Twigg, W. Warburton, W. W. Wells, C. R. Whittaker, D. R. Williams, R. L. Williams, M.C.

Temporary honorary Captain H. Nockolds.

Lieutenant (temporary Captain) C. R. Dudgeon, M.C.

Temporary Lieutenant J. S. Clark.

Quartermasters and honorary Majors: H. J. F. Audus, E. J. Buckley, J. Green.

Quartermasters and honorary Captains: F. C. Cross, C. A. Figg, (acting Major) J. T. Packard, E. B. Senior, F. Wilson.

Temporary Quartermasters and honorary Captains: B. G. Brook, T. W. Jent.

Quartermaster and temporary Lieutenant V. A. Bell.

Quartermasters and honorary Lieutenants: H. B. Lee, H. Steele.

Temporary Quartermasters and honorary Lieutenants: E. Kerstein, M.C., P. le Poidevin, J. B. Mackay, H. Miller, E. B. Snowden.

Royal Army Medical Corps (S.R.).

Captains (acting Lieut.-Colonels): C. J. A. Griffin, S. Miller, M.C., K. D. Murchison, D.S.O., A. T. Pitts, R. T. C. Robertson, D.S.O.

Captains: W. R. Blore, C. F. Burton, W. B. Cathcart, E. M. Cowell, T. G. Fleming, F. H. Goss, R. A. Greenwood, T. F. Hegarty, F. Jefferson, J. I. Lawson, W. McK. H. McCullagh, D.S.O., M.C., G. H. C. Mold, C. M. Page, H. G. Trayer.

Royal Army Medical Corps (T.F.).

Lieut.-Colonel W. E. Foggie.

Majors (temporary Lieut.-Colonels): E. B. Bird, D.S.O., J. Nightingale, C. A. A. Stidston, D.S.O., W. G. Sutcliffe, P. G. Williamson, M.C.

Major (acting Lieut.-Colonel) A. Callam.

Major T. A. Barron.

Captain and Brevet Major (temporary Lieut.-Colonel) C. H. S. Frankau.

Captains (temporary Lieut.-Colonels): J. Bruce, C. W. Eames.

Captains (acting Lieut.-Colonels): W. Blackwood, F. G. Dobson, C. L. Lander, M.C., H. B. Low, M.C., G. Mackie, D.S.O., J. MacMillan, M.C., A. J. Williamson.

Captain (temporary Major) E. Knight.

Captains: J. W. Anderson, M.C., C. F. Backhouse, F. G. Caley, O. Cattlin, J. W. Dale, H. N. Goode, J. M. Hamill, T. R. Kenworthy, G. C. King, G. H. Kirby, S. A. S. Malkin, A. C.

Mallace, R. P. Pollard, H. H. Robinson, M.C., F. E. W. Rogers, S. Scott, J. M. Smith, W. Stobie, A. C. Watkin.
Temporary Captain L. Blake.
Quartermaster and honorary Captain C. W. Braithwaite.
Quartermaster and honorary Lieutenant T. Priest.

CANADIAN FORCES.

Staff.

Colonels: H. A. Bruce, C.A.M.C.; H. M. Jacques, D.S.O., C.A.M.C.; A. E. Ross, D.S.O., C.A.M.C.; R. P. Wright, D.S.O., C.A.M.C.
Major (temporary Lieut.-Colonel) A. E. Snell, D.S.O., C.A.M.C.
Majors: G. H. R. Gibson, C.A.M.C.; G. G. Greer, M.C., C.A.M.C., T. A. Lomer, C.A.M.C.

Canadian Army Medical Corps.

Colonel J. M. Elder.
Lieut.-Colonels: G. J. Boyce, D. Donald, A. S. Donaldson, A. L. C. Gilday, J. A. Gunn, J. Hayes, D. P. Kappele, A. C. Rankin, S. J. Stewart.
Temporary Lieut.-Colonel J. N. Gunn.
Major (acting Lieut.-Colonel) H. H. Moshier.
Majors: A. W. M. Ellis, G. S. Mothersill, D.S.O., G. S. Strathy.
Temporary Major (acting Lieut.-Colonel) E. R. Selby.
Captains: J. E. Barry, H. McL. Cameron, W. A. Richardson, S. J. Streigt, W. C. Walsh, H. W. Whytock.
Temporary Captains: F. R. Hassard, M.C., H. G. Young, D.S.O.
Quartermaster and honorary Captains: J. E. Lawrence, J. E. Tulloch.

AUSTRALIAN IMPERIAL FORCE.

Staff.

Colonel R. B. Huxtable, D.S.O., V.D., A.A.M.C.
Lieut.-Colonels (temporary Colonels): F. A. Maguire, A.A.M.C., A. E. Shepherd, A.A.M.C.
Majors: W. J. W. Close, A.A.M.C., D. M. Embleton, A.A.M.C., W. J. Stack, A.A.M.C., W. Vickers, A.A.M.C.

Australian Army Medical Corps.

Lieut.-Colonels: E. T. Brennan, M.C., T. P. Dunhill, W. E. Kay, B. Quick, H. C. Taylor-Young, W. G. D. Upjohn.
Majors (temporary Lieut.-Colonels): A. F. Maclure, V. O. Stacy.
Majors: F. L. Bignell, E. A. Brummitt, A. L. Buchanan, A. R. Clayton, A. T. Dunlop, T. C. C. Evans, E. L. Hutchinson, D.S.O., F. N. le Messurier, D. S. Mackenzie, A. McKillop, P. A. Maplestone, D.S.O., A. V. Meehan, W. A. Morton, R. J. Taylor.
Captain (temporary Lieut.-Colonel) W. H. Collins, D.S.O.
Captains: R. D. Bartram, G. V. Davies, D.S.O., A. J. McK. Fargie, R. P. W. Francis, J. C. M. Harper, M. J. Holmes, A. J. de S. Howard, J. A. Love, R. G. McPhee, C. M. Samson.
Honorary Captain P. Smith.
Quartermasters and honorary Captains: J. I. Anderson, H. Hazlett, R. C. Rutter.

NEW ZEALAND MEDICAL CORPS.

Lieut.-Colonel E. J. O'Neill, D.S.O.
Majors: H. M. Buchanan, E. L. Marchant, E. R. Widdowson.
Captains: T. W. J. Childs, J. Mitchell.

SOUTH AFRICAN MEDICAL CORPS.

Lieut.-Colonel G. R. Thomson.
Major C. M. Murray.
Captain H. R. Lawrence.

INDIAN MEDICAL SERVICE.

Lieut.-Colonel J. B. Jameson.
Major (temporary Lieut.-Colonel) E. C. Hodgson.
Majors: D. H. F. Cowin, E. A. C. Matthews.

AMERICAN MEDICAL CORPS.

Temporary honorary Major V. H. Kazanjian (Harvard General Hospital).

The list also includes a large number of warrant and non-commissioned officers and privates of the R.A.M.C. and of the Colonial medical services, together with numerous members of the nursing services.

M. BILDT, Swiss Minister at Rome, recently gave £2,000 to the Italian Red Cross. The Minister of Siam gave £200.

THE French Government has established sanatoriums, each with two hundred beds, in all colonies of the French West Africa group (Senegal, Upper Senegal and Niger, Guinea, Côte d'Ivoire, Dahomey and Gaboon). These institutions are intended primarily for the reception and gratuitous treatment of sick native soldiers from the French armies, especially those suffering from curable tuberculosis. A dispensary for consultations and for gratuitous home treatment is to be established in the most important centres of the West African colonies and French Equatorial Africa.

Scotland.

THE SCOTTISH CHURCHES AND VENEREAL DISEASE.

ON May 23rd Dr. David Newman of Glasgow addressed a meeting of ministers of the Church of Scotland and the United Free Church on the subject of venereal disease. He said that the reasons why venereal disease demanded attention specially at the present time were: (1) That marked progress had been made in recent years in combating the ravages of the disease by exact diagnosis and effective treatment; (2) now that the report of the Royal Commission was in the hands of the public it was recognized by all who had a knowledge of the subject that it was high time that the whole question was pushed forward and a determined attempt made to control one of the greatest scourges that affect mankind; (3) in the past it had been a constant experience that after all wars there was a formidable increase in venereal disease. In Glasgow a local centre of the National Council for Combating Venereal Disease had been formed, and was carrying on active work. Attention was called by Dr. Newman to the immediate and remote effects of these diseases. If public opinion was not on the alert to use every measure to combat the evil, it would become a danger as great as the war itself. The question of prevention was mixed up with that of prompt and effective treatment. A clear and carefully considered scheme of instruction must be arranged—one for girls, another for boys—in regard to sex teaching and personal hygiene. The value of games and the occupation of the mind on healthy subjects was dwelt upon. From the moral aspect many men were faint-hearted, saying the disease was a necessary evil, and that it was impossible to put a stop to immorality. But the word impossible had been deleted from the vocabulary of medicine and surgery. Could not the Church do the same? Since the report of the Royal Commission was published many leaders in the Church had joined the National Council for Combating Venereal Disease, and had taken an active part in promoting its objects, but the great body of the clergy had not had the facts brought before them. While it was clearly the duty of the doctor to cure and prevent disease it was equally the duty of the Church to face the question with courage, and aid in lifting the whole subject to a higher sphere by purifying the thoughts of the rising generation. The medical profession was warring against the disease; the Church had to teach that unchastity was a serious sin in itself, quite apart from the danger of contracting disease, and passing it on as a hateful gift to the next generation.

DR. ELSIE INGLIS.

At the Royal Scottish Academy, Edinburgh, on May 27th, under the presidency of the Lord Provost, Prince George of Serbia formally presented to the Scottish nation a bust of the late Dr. Elsie Inglis, the work of Mestrovic, the Serbian sculptor. In accepting the gift, Mr. R. Munro, Secretary for Scotland, eulogized Dr. Inglis's noble work in Serbia. The bust is executed in bronze, and is considered both an excellent likeness and an admirable work of art. M. Yovanovich, Minister Plenipotentiary for Serbia, spoke of the great work accomplished by the Scottish Women's Hospitals, of which Dr. Elsie Inglis was the moving spirit, and expressed the gratitude and admiration felt by the Serbian people towards the women of Scotland.

England and Wales.

WARD FOR DISABLED PENSIONERS.

A PENSIONERS' ward at the David Lewis Northern Hospital, Liverpool, was formally opened by Colonel Sir Robert Jones, C.B., F.R.C.S., on May 25th. The ward contains twenty-eight beds, to be devoted entirely to pensioners requiring special treatment. The main object is to restore disabled soldiers so as to enable them to earn their own livelihood, and as far as possible resume their former civil occupation. An out-patient department is to be developed for electrical treatment and remedial exercises. This undertaking by the Northern Hospital will relieve the congestion of the Alder

Hey and Highfield hospitals, where the recent cases requiring orthopaedic treatment are received. Sir Robert Jones aptly remarked that a crippled soldier discharged too soon from the hospital became a "focus of discontent." The aim of the present undertaking was, he said, to prevent such a misfortune by carrying out further treatment to enable the patient to become fit for re-employment and once more independent. Such measures were imperatively required, and he felt proud that Liverpool was among the first cities to found such an institution for disabled soldiers.

Correspondence.

ADAPTATION AND DISEASE.

SIR,—In July last year a controversial correspondence between Dr. J. G. Adami and Sir Ray Lankester was published in your periodical. I heard something of it at the time, but recently Dr. Adami has published his Croonian lectures on adaptation and disease, with other matter, in book form, and has reprinted the correspondence as an appendix in the volume. This correspondence originated in a severe criticism by Sir Ray Lankester of the substance of Dr. Adami's lectures, and of the manner in which the subject was treated. The volume has recently come into my hands, and as one who has taken some part in the investigation and discussion of adaptation and its evolution, I desire to make some comments on the arguments of both the medical and the zoological writers.

Dr. Adami uses the term "academic" in an unusual sense, and applies it with an unfavourable meaning to men who have made important original contributions to science. Academic does not, as generally used, mean "more concerned with tradition than discovery," but simply the pursuit of pure knowledge as distinct from its practical application. The medical man who investigates the action of different conditions upon bacteria is quite as academic as he who studies the development of a starfish; the former only ceases to be academic when he applies his discoveries in a particular treatment of disease. Sir Ray Lankester is well known to have shown himself a brilliant and original morphologist, who in his time has dislodged a good many traditions. He has not, however, concerned himself with the investigation of evolutionary problems, and in this branch of biology is perhaps open to the charge of retaining too great a respect for tradition, in particular the Darwinian tradition. It is rather difficult to understand definitely what view Sir Ray takes with regard to the influence of external conditions. He states that he has always maintained that "specific variation" may be induced by external influences. If a specific variation is due to external causes—and it can scarcely be specific unless it is hereditary—it follows that Sir Ray has always maintained that acquired characters may be transmitted by heredity. Yet the last paragraph of his first letter states that it is widely admitted that no case of such transmission has been demonstrated, and seems to imply that he agrees with Weismann that acquired characters are not inherited. Discussion, however, of evolutionary phenomena under the general terms of specific variation and acquired characters belongs to a bygone period. At the present day we require physiological details and concrete examples.

With the general tendency of Dr. Adami's views I am in agreement. His criticism of Bateson's extraordinary theory that no new characters have ever arisen, but that all possible characters were originally contained in the protoplasm of the primordial ancestral forms is perfectly sound, but that does not justify him in descending to ridicule. A great part of Dr. Adami's argument is concerned with specific changes produced in bacteria by conditions of life, but that does not in the least bear on the question how modifications of the somatic tissues in the higher animals can be inherited by the offspring. With this latter question Dr. Adami deals, but he gets no farther than the conclusion that influences from without affecting the organs of internal secretion may through their hormones influence the germ cells, so that acquired metabolic disturbances are inherited. How does this help us to understand the evolution of the horse's foot or the bat's wing? Dr. Adami has the audacity to claim priority with respect to the publication of a hormone theory of heredity, and to place my name in a footnote, together with those of Heape, Bourne, MacBride, and Dendy, no one of whom, I believe, had published anything of importance on the subject prior to 1908, when my own theory was first printed. According to this note we have "since enunciated" the conclusions reached by Dr. Adami in 1901. He reprints in this volume the paper to which he refers, from the *New York Medical Journal* and BRITISH MEDICAL JOURNAL of that year. The relevant part of this paper is under three headings in the latter portion of it: (1) The non-inheritance of acquired mutilations. This need not detain us, as it is negative. (2) The indirect transmission of acquired diathesis. The local lesion is not inherited, but the disease may lead to altered condition of the blood, which may affect the germ cells and so influence the offspring. This, as further explained in the paper, is not inheritance in the morphological sense at all, but simply poisoning of the germ cells. (3) The direct transmission of acquired constitutional states. The examples given are occasional inheritance of acquired immunity, and greater susceptibility to a disease in the offspring of parents who have suffered from the disease. None of these conclusions throw any light on the problem of the evolution of structural adaptation by the inheritance of somatic modifications. My theory of the evolution of secondary sexual and adaptive characters by the inheritance of somatic modifications was published in the *Archiv für Entwicklungsmechanik* in 1908, and was based on the discoveries of the physiologists concerning the action of hormones. It certainly owed nothing to the vague medical generalities of Dr. Adami.

With regard to the other zoologists considered by Dr. Adami worthy with myself of mention in a footnote, and there accused by him of ignoring his claim to priority, my knowledge of their relation to the doctrine of chemical action in heredity is as follows: Of Heape's share in the matter at the present moment I know nothing. Bourne expounded the idea in an address to the British Association some time later than 1908, and, when challenged on the subject honourably acknowledged my claim to priority in a letter to *Nature*. Dendy put forward the theory in very general terms in his book on *Evolutionary Biology* in 1912, four years after the publication of my paper. The case of MacBride is the most remarkable. In his *Embryology of the Invertebrates* (1914) he referred to hormones or internal secretions as the probable agents by which somatic changes could affect the reproductive cells, and attributed the suggestion to Professor Langley. When I informed him that I had published a detailed theory on the subject in 1908, his reply was that he had not been aware of my prior publication. This reply was the more remarkable because Professor Langley had published nothing on the subject, but had merely conveyed his views to MacBride in conversation.—I am, etc.,

J. T. CUNNINGHAM.

London Hospital Medical College, May 9th.

THE FORMATION OF SEQUESTRA.

SIR,—I have recently made a study of sequestra from the purely radiological standpoint, and believe that I have often seen split-off fragments of bone throw out a fringe of callus and live to be reunited to the parent bone. I found it difficult to understand why some of these detached fragments should live and others die. It seemed evident that neither persistence of blood supply nor adherence of periosteum was a valid explanation, and in an article awaiting publication in the *Archives of Radiology* I have suggested that those fragments die which are exposed directly to bacterial toxins, while others escape by being shut off from the septic area by other tissues. Sir Kenneth Goadby's article (BRITISH MEDICAL JOURNAL, May 25th, p. 581) confirms the first part of this surmise, but I am surprised at his statement that "bone fragments split off at the original injury *invariably* become sequestra."—I am, etc.,

Newcastle-on-Tyne, May 25th. T. L. BUNTING.

REMOVAL OF FILARIA LOA FROM THE EYE.

SIR,—It may interest readers to know that five years ago a man suddenly appeared before me late at night and abruptly asked, "Can you cut out a worm from my eye?" Having said "Yes," I was told it was a filaria, probably

female, as he felt another in his body, and that he had had one before some years back, having got this one in the Argentine.

I put him close under the electric light and saw distinctly the wriggling form of the worm working towards the inner side under the translucent pink of the eyelid. I caught the tail up together with the skin with a pair of "bull-dog" forceps. The worm in its struggles straightened out, enabling me to cut down upon its head, which I seized with another pair of forceps, and, releasing the first pair, wound the worm out complete by twisting the front part round the forceps. Dr. Harford, of Livingstone College, Leyton (where I then lived) confirmed the man's opinion that it was a female *loa*.

I have the worm and should be pleased to let any one skilled in the life-history of these creatures inspect it.—I am, etc.,

HARDING H. TOMKINS, M.R.C.S.

Parkfield, South Ealing Road, Ealing, W.5, May 25th.

FAMILY HISTORY IN LINGUAL CANCER.

SIR,—I am interested in the subject of cancer of the tongue and am anxious to ascertain whether there is a family predisposition to the disease, such as occurs in some other forms of cancer.

Will any of your readers kindly tell me whether they know, at first hand, of (*a*) cancer of the tongue occurring in more than one member of the same generation of a family, (*b*) in successive generations of the same family—that is, father and son, (*c*) whether in the rarer case of lingual cancer in women the disease has occurred in families with a markedly cancerous history.—I am, etc.,

D'ARCY POWER.

London, W., May 25th.

EXCISION OF WOUNDS AND FLAIL LIMBS.

SIR,—It is time a note of warning was sounded as to the excessive excision of the wounds in compound fractures. Several cases have lately come to this hospital with flail legs and arms from undue removal of bone fragments. Where more than two inches of femur have been excised firm union seems improbable. The end results of these are likely to be less satisfactory than of cases with extensive comminution, some sepsis (controlled by Carrel-Dakin treatment), and sequestrotomy of necrosed fragments at a late period. Doubtless many of the wound excisions prevent dangerous sepsis and save limbs and lives. It is the happy medium for which I plead.—I am, etc.,

A. NEVE, F.R.C.S.E., Major R.A.M.C.

War Hospital, Dartford, May 27th.

A MINISTRY OF HEALTH.

SIR,—The scheme of the British Medical Association's pamphlet assumes naturally that the doctor knows that his duty is to cure a patient as soon as possible and to persuade a patient to carry out his instructions. The accusation that the scheme of the Association is humdrum and unimaginative might with greater aptness be applied to Dr. Veale's ideal of state control. As to voluntary hospitals, one would have thought that the results of state control, as seen during the present war, would have sufficed to prove how unsatisfactory it is in its practical working. I for one should be indeed sorry to see our voluntary hospitals handed over to the care of the state. State control could not shorten the waiting list. Your space is precious, otherwise I should have liked to have dealt with Dr. Veale's contentions in detail. Fortunately, we are not all so melancholy as your correspondent.—I am, etc.,

S. J. ROSS.

Bedford, May 25th.

The Services.

TERRITORIAL DECORATION.

THE Territorial Decoration has been conferred upon the following members of the R.A.M.C.(T.): Lieut.-Colonels W. A. Benson, J. P. Bush, C.M.G., W. K. Clayton, T. Frankish, A. M. McIntosh, J. Oldfield; Majors A. Butler, R. Emmett, F. L. Fennell, A. Fowler, C. W. Miller, D.S.O.; Quartermaster and honorary Major J. Dunn; Quartermaster and honorary Captain A. J. H. Knights.

Obituary.

LIEUT.-COLONEL JAMES FORBES BEATTIE, R.A.M.C.(ret.), died at Insch, Aberdeenshire, on March 27th, aged 76. He was educated at King's College, Aberdeen; he graduated M.A. in 1860 and M.D. and C.M. of Aberdeen University in 1863; he entered the army as assistant surgeon on September 30th, 1863, and retired as brigade-surgeon-lieutenant-colonel on May 21st, 1890. He served in the Ashanti war of 1873–74 (medal); in the Afghan war of 1878–80, where he took part in the defence of Kandahar (medal and clasp); and in the Egyptian war of 1882, when he was present at the battle of Tel-el-Kebir (medal and clasp and Khedive's bronze star).

SURGEON-MAJOR EDWARD LOUIS MCSHEEHY, R.A.M.C. (retired), died at Wimbledon on May 1st, aged 84. He was educated at Queen's College, Cork, and at the R.C.S.I. Medical School in Dublin, and took the M.D. of the Queen's University of Ireland in 1856, and the L.R.C.S.I. in the same year, and subsequently the M.Ch. in 1866 and the F.R.C.S.I. in 1867. He entered the army as assistant surgeon on May 27th, 1857, became surgeon on May 27th, 1869, and surgeon-major on March 1st, 1873, retiring on May 28th, 1877. He served in the second China war of 1860, receiving the medal, and was a J.P. for the county of Surrey.

Medical News.

THE Medical Defence Union announces in our advertisement columns this week that an agreement has been entered into with the Yorkshire Insurance Company, whereby for an annual premium of 7s. 6d. an indemnity insurance can be effected for £2,500 against legal costs and damages in adverse actions at law in which the defence has been undertaken by the Union.

AT the annual meeting of the Kent Branch of the British Medical Association, to be held on Wednesday, June 12th, at 3.30 p.m., at the Techpical Institute, Tonbridge, the president, Dr. Claude Wilson, will give an address on the significance of cardiac murmurs.

AS a recognition of the long service of Lieut.-Colonel Charles Brook, late R.A.M.C.(T.F.), the General Officer Commanding-in-Chief has been pleased to appoint him honorary consulting surgeon to the 4th Northern General Hospital, Lincoln.

A FAIR in aid of the Elizabeth Garrett-Anderson Memorial will be held at the London (Royal Free Hospital) School of Medicine for Women, 8, Hunter Street, W.C.1, on Saturday, June 8th, from noon to 9 p.m.; admission 1s.

THE late Dr. Henry Maudsley left £60,718 net.

DR. W. C. BURNS of Raasay has been appointed a Justice of the Peace for Inverness-shire.

THE Royal Dental Hospital, Leicester Square, has received an additional donation of £100 from the Worshipful Company of Grocers.

DR. AND MRS. HENRY MATURIN of Hartley Wintney, Hants, recently celebrated their golden wedding, and were the recipients of a public presentation.

A DISCUSSION on disinfection in public health work will be opened by Dr. W. G. Savage, M.O.H. Somerset County Council, at a meeting of the Royal Sanitary Institute at Taunton on Friday, June 14th, at 11 a.m.

MISS EDITH HELEN BARRETT, O.B.E., M.B., honorary secretary of the Australian Branch of the British Red Cross Society, has been appointed a Commander of the Order of the British Empire.

PROFESSOR UHLENHUTH has come to the conclusion that under favourable conditions the *Spirochaeta icterogenes* may multiply in water and other media outside its human host.

THE Council of the Carnegie Foundation, at a meeting recently held in Rome, decided to give £4,000 towards the erection of a sanatorium for tuberculous Italian soldiers.

THE Local Government Board has issued a revised edition of the list of sanatoriums and other residential institutions (H.M. Stationery Office; price 1d.) approved by the Board under the National Insurance Act, 1911, for the treatment of persons suffering from tuberculosis, and resident in England, excluding Monmouthshire.

THE General Officer Commander-in-Chief of the French Forces in Italy mentioned H.R.H. the Duchess Elena d'Aosta (*née* Princess Hélène Louise Henriette de France) in the Order of the Day, and decorated her with the War Medal in recognition of her work with the Italian Red Cross and the active assistance she has given to medical units of the French army in Italy.

Professor J. G. Adami, F.R.S., M.D., and Dr. Amand Routh will speak on the subject of antenatal and neonatal factors in infant mortality at the conference to be held at the Central Hall, Westminster, on July 2nd and 3rd, during National Baby Week. Dr. Truby King, C.M.G., who will lecture on the hygiene of infancy, has undertaken the section dealing with infant physiology and comparison with baby plants and animals at the Educational Exhibition to be held from July 1st to 6th. Mrs. H. B. Irving and the St. Pancras School for Mothers will exhibit a model infant welfare centre; Dr. Eric Pritchard and the St. Marylebone Health Society will give instructions in infant feeding; the Midwives Institute has undertaken a section dealing with the expectant mother; the Association of Infant Welfare and Maternity Centres will demonstrate mothercraft; and Dr. H. C. Cameron will assist in the section devoted to diseases of infancy.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* British Medical Journal *alone unless the contrary be stated.*

Correspondents who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

Authors desiring reprints of their articles published in the British Medical Journal are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

The postal address of the British Medical Association and British Medical Journal is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the British Medical Journal, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediscra, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Reference Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

LETTERS NOTES, ETC.

Treatment of Meningitis.

Captain H. M. Cade, R.A.M.C., officer in charge Cerebro-spinal Fever Laboratory, Ipswich, writes with reference to the treatment of meningitis as follows: I have seen many cases occurring in children and young soldiers where the characteristic clinical signs of meningitis have been present, where on lumbar puncture a clear fluid, increased in quantity and tension, has been procured, but where the fluid on examination has proved to be of normal character. May not Mrs. Fysh's three cases of recovery been of this type, that is, not cases of meningitis at all?

My excuse for taking up valuable space is to point out the great value of early lumbar puncture in all cases of, or suspected cases of, meningitis. By adopting this procedure not only will the diagnosis be cleared up, but also, if the case is one of meningitis, the nature of the invading organism will be determined. Lumbar puncture is the most useful therapeutic agent at our disposal in the treatment of meningitis. It relieves the intracerebral pressure and drains away toxins.

In cerebro-spinal fever (the meningococcus is the commonest pyogenic organism causing meningitis) anti-meningococcic serum given intrathecally has markedly lowered the mortality-rate. Even in the next common form of suppurative meningitis, namely, pneumococcal, a serum such as Pane's can be tried by the spinal route. This method will give better results than the unscientific and retrograde procedure advised by Mrs. Fysh under the title "iodine treatment."

Note on Treatment of Acute Gas Cases.

Dr. Thomas D. Lister (Consulting Physician for Lung Cases to the Prince of Wales's Hospital) writes: A method which I introduced at the Prince of Wales's Hospital for Officers (Great Central Hotel, Marylebone) last summer, of steam-spraying the air passages with Dobell's solution, I have now supplemented when necessary by using a *fine* oily nebula with cocaine 2 grains to the ounce, such as is given by the aeriser of Messrs. Oppenheimer with their No. 9 neboline compound. This is used after the mucous membrane has been washed by the spray of Dobell's solution, or after coughing, and seems to afford relief. The addition of 1 per cent. cocaine and 1 in 10,000 adrenalin to a 2½ per cent. solution of boracic acid also affords great relief to the eye conditions as a drop—a temporary measure which may be repeated.

The Fear of Small-pox.

In the *Revista de Medicina y Cirugia practica* of May 14th there is a story which illustrates the inhumanity which the fear of infectious diseases may produce among ignorant people. Stories of similar cowardice on a larger scale are told of Milan, Marseilles, London, and elsewhere in our own country during the great epidemics of plague which occurred in the middle ages, and down to the beginning of the eighteenth century. But that small-pox should still cause such terror, even in a backward country like Spain, must cause sad reflections to believers in human progress. In an outbreak of that disease which occurred in January last at Villavendimio (Zamora) the wife of the sacristan of the village was attacked. Her husband could find no one to help him in giving her the necessary attentions till the poor law medical officer, Dr. Fernando Perez Rodriguez and the parish priest, Don Feliz Cabago, took it in turns to tend the patient. When she died the doctor, after giving directions for the disposal of the remains, returned to his other duties. Later on, meeting with the priest, he learnt that the body was still where they had left it, as the husband had failed either by entreaties or by liberal offers of money to find any one to help him in taking it to the cemetery. Thereupon they laid out the body, procured a coffin, and carried it to the cemetery, where they helped the gravedigger to bury the poor woman decently. The devotion of the doctor and the priest has aroused such admiration that a widely endorsed petition has been forwarded to the proper authority, asking that the Cross of Beneficence should be conferred on them.

Petrol for Scottish Practitioners.

It appears that some medical practitioners in Scotland do not order their allowance of petrol from local dealers until the close of the month, with the result that the necessary supplies may not reach the dealer's premises in time for them to issue the current month's quantity. In order to secure prompt delivery practitioners should send in their vouchers as early as possible in each month. Those who experience difficulty in this matter are invited to communicate with the Clerk of the Scottish Committee of the British Medical Association, 155, St. Vincent Street, Glasgow.

Certificates to Prostitutes.

We learn from a report in the *Folkestone Herald* of May 11th that during the hearing of a charge of soliciting against a prostitute the chief constable stated that the woman had in her possession "a certificate from a local doctor stating that he could find no trace of venereal disease on her. He presumed she kept that to show the men she accosted." This he thought was a new system. The chairman of the bench, in passing a sentence of fourteen days' imprisonment, accompanied by a recommendation for expulsion, said that it "seemed strange that a local doctor should give these certificates to prostitutes." In the next case, in which the charge was similar, the chief constable said that this woman also had a certificate from a local doctor, and the magistrate's clerk remarked that the certificate was given on the same day as the last case. From the facts as stated in the report before us we are inclined to agree with the chairman.

Medical Sickness and Accident Society.

"Vis veritas" writes: Permit me to endorse all that "An Old Member" of the "Medical Sickness Society" writes concerning the injustice done to old members who rallied to its support in its early days. Formerly we used to get a small bonus every year, but this was stopped in order to give us a larger one on retiring from benefit. Now it appears we are to get nothing. I am inclined to think that the whole affair is *ultra vires* and might be contested.

The Human and the Equine Foot.

Mr. T. S. Ellis (Gloucester) writes: In my narrative of the result of an accident to my own foot, given in the Journal of May 25th, p. 608, there is an unfortunate slip. A sub-astragaloid dislocation involves a displacement of the bones in front of the astragalus and not of the astragalus itself.

The appointments of certifying surgeons to the following places are vacant: Canterbury (co. Kent); Bishop's Waltham (co. Southampton); Gadgate (co. Lancaster).

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Seven lines and under	0	6	0
Each additional line	0	0	9
Whole single column	4	0	0
Whole page	12	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

Note.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.